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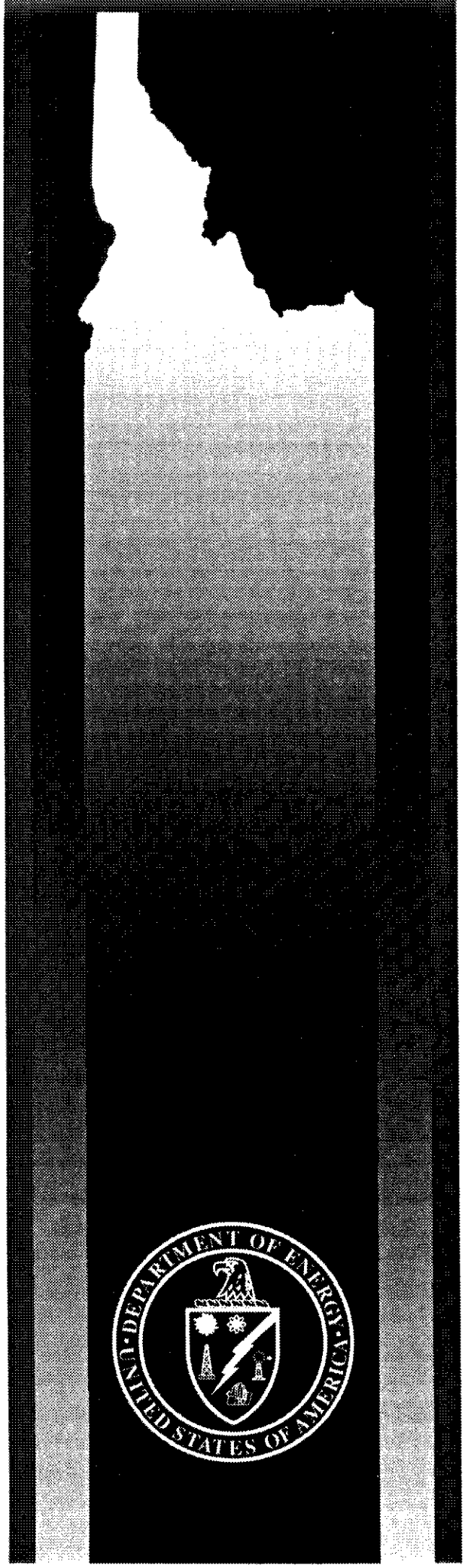

LONG-TERM LAND USE FUTURE SCENARIOS FOR THE IDAHO NATIONAL ENGINEERING LABORATORY (DRAFT)

Prepared for
U.S. Department of Energy Idaho Operations Office
Idaho Falls, ID 83401
Under Contract No. DE-AC07-91ID12919

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ABSTRACT

In order to facilitate decisions regarding environmental restoration activities at the Idaho National Engineering Laboratory (INEL), the United States Department of Energy, Idaho Operations Office (DOE-ID) conducted analyses to project reasonable future land use scenarios at the INEL for the next 100 years. The methodology for generating these scenarios included: review of existing DOE plans, policy statements, and mission statements pertaining to the INEL; review of surrounding land use characteristics and county development policies; solicitation of input from local, county, state and federal planners, policy specialists, environmental professionals, and elected officials; and review of environmental and development constraints at the INEL site that could influence future land use.

These analyses resulted in the development of specific issues and assumptions that guided the generation of 25-, 50-, 75-, and 100-year future land use scenarios of the INEL. These scenarios project no change to the present INEL boundaries within the 100-year period, and that future industrial development will most likely be concentrated in the central portion of the INEL and within existing major facility areas, as compared to other portions of the site.

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TABLES

ACRONYMS

AEC	Atomic Energy Commission
ANL-W	Argonne National Laboratory–West
ANP	Aircraft Nuclear Propulsion
ARA	Auxiliary Reactor Area
ATR	Advanced Test Reactor
BLM	Bureau of Land Management
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CTF	Containment Test Facility
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations Office
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EBR-I	Experimental Breeder Reactor I
EBR-II	Experimental Breeder Reactor II
EIS	Environmental Impact Statement
ER&WM	Environmental Restoration and Waste Management
EPA	U.S. Environmental Protection Agency
ERDA	Energy Research and Development Administration
ERIS	Environmental Restoration Information System
ES&H	Environmental, Safety, and Health
FFA/CO	Federal Facility Agreement/Consent Order
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year
GIS	Geographical Information System
gpm	Gallons Per Minute
GPP	General Plant Project
GSA	General Services Administration

ICPP	Idaho Chemical Processing Plant
IDHW	Idaho Department of Health and Welfare
IET	Initial Engine Test
IETC	Idaho Engineering Technical Center
INEL	Idaho National Engineering Laboratory
IPC	Idaho Power Company
LCCDA	Liquid Corrosive Chemical Disposal Area
LICP	Line-Item Construction Project
LMFBR	Liquid-Metal Fast Breeder Reactor
LOFT	Lost-of-Fluid Test
MOU	Memorandum of Understanding
MVA	Mega Volt Amperes
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NODA	Naval Ordnance Disposal Area
NPL	National Priorities List
NPR	New Production Reactor
NRC	Nuclear Regulatory Commission
NRF	Naval Reactors Facility
NRHP	National Register of Historic Places
NRTS	National Reactor Testing Station
OU	Operable Unit
PBF	Power Burst Facility
PCB	Polychlorinated Biphenyl
PLO	Public Land Order
PMF	Probable Maximum Flood
PREPP	Process Experimental Pilot Plant
QAP	Quality Assurance Plan
R&D	Research and Devenclopment
RCRA	Resource, Conservation, and Recovery Act

RESL	Radiological and Environmental Sciences Laboratory
ROLSP	Regulatory Overview for Land and Surplus Planning
RSTA	Radioactive Storage and Treatment Area
RWMC	Radioactive Waste Management Complex
SLR	Source Lineage Reporting
SMC	Specific Manufacturing Capability
SSE	Safe Shutdown Earthquake
SSP	Site-Specific Plan
SWEPP	Stored Waste Examination Pilot Plant
TAN	Test Area North
TMI	Three-Mile Island
TRA	Test Reactor Area
TSA	Transuranic Storage Area
TSI	Technical Site Information
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WAG	Waste Area Group
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WRRTF	Water Reactor Research Test Facility

Idaho National Engineering Laboratory Long-Term Land Use Future Scenarios (DRAFT)

1. INTRODUCTION

The Idaho National Engineering Laboratory (INEL) is operated by the United States Department of Energy (DOE), U.S. Department of Energy, Idaho Operations Office (DOE-ID). It was established in 1949 as the National Reactor Testing Station (NRTS) following a nationwide search for a suitable area in which to test new applications for atomic energy. The site name was changed to INEL in 1974 to better characterize the mission of the facility. Today, the INEL is a multiprogram laboratory whose primary mission is to provide the nation with innovations in nuclear technologies and unique scientific and engineering capabilities in nonnuclear programs that provide commercialization potential or enhance the quality of the environment (DOE 1993b).

Portions of the site were originally used as a gunnery range by the U.S. Navy during World War II. The present site was created through a series of withdrawals and purchases of federal, state, and private lands (Public Land Order [PLO] 318 [1946], 545 [1949], 637 [1950], 1770 [1958]). The 890-square-mile (mi^2) or 569,600-acre site is located in southeastern Idaho, 29 mi west of the City of Idaho Falls, and includes portions of five Idaho counties: Bingham, Bonneville, Butte, Clark, and Jefferson. It consists of flat to gently rolling topography and is largely undeveloped. Only approximately 2% (11,400 acres) of the site is utilized by the 659 buildings and 2,000 support structures that total approximately 3 million square feet (ft^2) of floor space, and supporting infrastructure operations.

Several recent developments have resulted in a growing need for a comprehensive, long-term approach to site planning and development (see Section 1.1). In response to those developments, DOE-ID established a long-term land use team to develop technically defensible future scenarios for the INEL. The process used by the team to project the scenarios is described in Section 1.2.

1.1 Need for INEL Long-Term Land Use Scenarios

The purpose of this report is to provide the following:

- Long-term land use information to facilitate decisions regarding environmental restoration activities
- Assemble existing information that will assist in forming the basis for reasonable future land uses.

As a result of contamination from past operations, INEL was placed on the U.S. Environmental Protection Agency's (EPA's) National Priorities List (NPL) in 1989 and designated as a Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. In 1991 a Federal Facility Agreement/Consent Order (FFA/CO) was signed by the DOE, the

Idaho Department of Health and Welfare (IDHW), and the EPA.[a] The FFA/CO obligates the DOE to pursue cleanup activities at each contaminated site at INEL according to specific enforceable schedules (DOE 1991a).

INEL environmental restoration and waste management (ER&WM) have expanded significantly as DOE complies with the cleanup schedules agreed to under the FFA/CO. By the end of 1990, over 90 operable units (OUs) and over 400 other sites containing hazardous, radioactive, mixed, and sanitary wastes were identified at INEL (DOE 1993a). The level and type of contamination vary among the OUs and other sites.

CERCLA and the National Contingency Plan (NCP)[b] require federal agencies to conduct baseline risk assessments (BRAs) as part of the cleanup process. BRAs define the potential effects that releases of hazardous substances might have on individuals or populations under possible future land uses (EPA 1989). The NCP recommends that BRAs take a conservative approach to projecting future land use by incorporating the possibility of a residential use at formerly contaminated locations. The NCP concedes, however, that a conservative assumption may not be supportable for sites in which residential use is unlikely. In such cases, risks associated with industrial, commercial, recreational, and agricultural uses might be more suitable (EPA 1990). The INEL long-term land use future scenarios document is designed to assist the BRA process in documenting a basis for reasonably anticipated future land uses.

Professional opinions differ on achievable remedial levels associated with current technology and budget constraints. However, there is some agreement on basing cleanup strategies on eventual land uses. For example, a site that will eventually be released for unrestricted use, such as residential development, may be subject to more stringent and costly standards than a site designated for partially restricted industrial use, such as a waste disposal facility. Therefore, the development of a future land use scenario can help to determine applicable cleanup standards by first presenting potential land uses (DOE 1993a). The consideration of alternative future land use scenarios is becoming an important strategy in the DOE-ID ER&WM program to help select appropriate future remediation strategies. It should be noted, however, that remedial action decisions made in the past, based on past land use assumptions, will not change based on new assumptions presented in this document.

DOE Order 4320.1B, Site Development Planning, effective January 7, 1991, provided guidance for land use planning at DOE sites and facilities. It established policies and assigned responsibilities and authorities for planning and development of DOE sites. It required all DOE sites to have in place an ongoing, rational process for planning land use and facility development (DOE 1991c). The purpose of such planning is to:

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a. Federal agencies that have facilities included on the NPL are required to enter into agreements with the EPA. These interagency agreements are designed to expedite completion of remedial actions in response to the release or potential release of hazardous substances to the environment.

b. The NCP implemented the regulatory requirements of CERCLA.

- Document the need for land and facilities
- Assess and update site resource requirements
- Respond to the mission requirements set by senior DOE management
- Project needs for a 20-year period (DOE 1993b).

The DOE is undertaking an effort to downsize and reconfigure its entire nationwide weapons complex, and it is considering the possibilities of reusing and dismantling facilities at all DOE sites. While defense-related nuclear research will probably remain as a component of INEL's mission, improved relations between the United States and former Soviet Union and continued pressure on policy makers to reduce the federal budget will likely result in reduced funding for defense research. Budget reductions may result in a new emphasis on domestic research and development at INEL. Such changes would require the development of new facilities; reuse or retrofitting of existing facilities; and/or closure of current facilities. In addition, new technological advancements such as fusion, nuclear space propulsion, nuclear medical applications, and more advanced ER&WM technologies, will provide INEL with new opportunities to place itself at the forefront of domestic and environmental research. Such opportunities may also require the development of new facilities at the site.

Like other federal facilities, INEL is operating within tighter budgetary constraints (DOE 1993c). Given these budgetary pressures, INEL will likely consider ways to achieve program objectives at lower cost. To achieve the INEL mission more efficiently, DOE will take full advantage of existing infrastructure and retrofit outdated facilities for new projects whenever possible. Moreover, site factors and constraints that would increase development costs (such as flood-prone areas, wetlands, and contaminated areas) will be identified early to allow for more cost-effective development.

To date, most DOE-ID planning documents have dealt with planning horizons of 5 to 20 years and have focused on specific portions of the site rather than INEL as a whole. However, information about potential long-range (i.e., 50- to 100-year) land uses is needed to support assessment of onsite risks, and cleanup decisions by projecting the site's potential future development characteristics. Consideration of INEL as a whole will also allow for a more comprehensive and integrated decision making.

It should be noted that the information presented in this analysis is not intended to constitute a future land use planning document and therefore does not make any commitments, decisions, or restrictions by DOE concerning future land use. Rather, it projects the anticipated type and general location of future land uses based upon existing land use policies and goals. Notwithstanding, the document may serve as one of several resources available to INEL land planners for developing future land use policies.

1.2 Method Used to Develop Long-Term Land Use Future Scenarios

To initiate consideration of long-term land use issues at INEL, DOE-ID convened a Long-Term Land Use Team. The team was assisted by a Long-Term Land Use Steering Committee composed of DOE personnel and contractor managers, land planners, and support personnel. The team was directed to develop reasonable future land use scenarios by incorporating current and future missions of INEL

while analyzing the site's existing environmental and development constraints. Specifically, the planning team sought to review existing data sources and policies to:

1. Identify general areas in which new facilities would likely be located by utilizing the existing infrastructure while considering probable design criteria and environmental constraints

2. Provide a resource for future decision-making associated with development

3. Provide input to the creation of a workable, comprehensive cleanup policy with achievable objectives

4. Support the BRA process.

It should be clearly stated that the land use team used existing data gathered from DOE, other federal agency, state, and county documents, and ongoing research efforts for the purpose of developing the long-term land use scenarios.

The Long-Term Land Use Team first convened in November 1992 to discuss major issues affecting the land development characteristics at INEL, identify issues that pointed to future trends, and select a process for generating likely future land use scenarios for the site. Long-term land use scenarios were developed using the following components:

Analysis of Site and Regional Development Characteristics. Current and projected development activities were assessed. The team reviewed all INEL site-development plans, mission statements, and institutional plans; county and municipal comprehensive plans, resource management plans, and development ordinances; and discussions with INEL site managers and local, county, state, federal, and tribal officials.

Preparation of Constraint Overlays. A series of six development constraint overlays was prepared over a base map that included INEL's current facilities (see Appendix A). Referred to as the INEL Environmental and Development Constraints Overlay Map Series, the maps present relevant site characteristics that will likely impact future development and illustrate characteristics such as: hydrography, surficial materials, archaeological/cultural resources, contaminated areas (i.e., hazardous materials, ordnance), ecologically sensitive areas, and ownership and land uses at INEL and neighboring property bordering the site. The maps were generated from the Environmental Restoration Information System (ERIS) database which contains comprehensive information on various land characteristics at INEL and surrounding lands (EG&G 1993). In addition, a map depicting seismic characteristics on and around the INEL was reviewed. Because of the scale necessary to adequately depict these features did not conform to the Overlay Map Series, the map is included in Appendix B.

Definition of Assumptions and Issues. A list of relevant issues that could impact future land use at the INEL was developed using existing planning documents. Planning assumptions were defined in areas where greater uncertainty exists regarding future land use. These were defined using information regarding the site's development opportunities and constraints, input from the steering committee and regional planning officials, and information included in pertinent planning documents.

Generation of Scenarios. Based on assumptions and issues identified by the planning team, a series of four land use scenarios was developed for the years 2019, 2044, 2069, and 2094. Each scenario is presented as a map to illustrate likely site development characteristics including issues such as: new development; decommissioning of facilities; reuse of facilities; and potential new uses of INEL lands. These maps are referred to as the INEL Future Scenarios maps and they are provided in Appendix C.

The remainder of this report is organized into four sections: Section 2 presents a review of existing INEL and regional planning documents and processes and identifies their relevance to future land uses at INEL. Section 3 discusses specific environmental and development constraints at INEL as they relate to new and/or expanded facilities and likely changes in land use over time; this section is supplemented by the INEL Environmental and Development Constraints Overlay Map Series. Section 4 identifies the key issues and planning assumptions generated to provide a basis for developing the future scenarios. Section 5 describes the projected land use scenarios for the INEL; this section is supplemented by Appendix C.

2. EXISTING INEL AND REGIONAL PLANNING DOCUMENTS

The Long-Term Land Use Team reviewed current planning documents relevant to operations at INEL to generate the land use scenarios and to ensure that the scenarios are projected according to existing DOE planning strategies. This review provided background information on the operations and status of existing facilities, infrastructure, current and projected programs, and goals and policies that might influence future land use and development at the site. Development characteristics in the region surrounding INEL were also examined through a review of comprehensive plans and census data and discussions with county and local officials and federal and state agency representatives through a participation forum convened to provide input to the planning team. Summaries of the information obtained from these sources is presented below.

2.1 Pertinent INEL Planning Documents and Programs

This section identifies and summarizes current INEL plans, programs, and policies that may directly or indirectly influence land use decision-making at INEL.

2.1.1 INEL Site Development Plan

In accordance with DOE Order 4320.1B, INEL has adopted a 20-year site development planning document. Published in March 1993, the three-volume INEL Site Development Plan includes the Technical Site Information (TSI), the Landlord Site Development Plan, and the Technical Site Information Five-Year Plan. The purpose of the plan is to provide a working management tool that ensures the orderly growth and development of facilities at INEL. The plan specifically addresses five of the existing major facility areas: Test Area North (TAN), Test Reactor Area (TRA), Central Facilities Area (CFA), Power Burst Facility (PBF), Radioactive Waste Management Complex (RWMC), and various site-wide activities. Specific plans for the Naval Reactors Facility (NRF), Idaho Chemical Processing Plant (ICPP), and the Argonne National Laboratory–West (ANL–W) are not addressed within the three volumes (DOE 1993b). Future missions for these facilities are addressed within other DOE documents (see Section 2.1.3).

The TSI provides information on INEL as a whole and each facility area under the cognizance of DOE-ID. It also provides a master plan for development activities at INEL for a 20-year planning horizon. This master plan outlines basic planning assumptions for INEL as a whole and for the five facility areas. All of the assumptions were utilized as input to formulate the assumptions presented in Section 4 of this document. These assumptions include the following:

- The CFA will continue to serve as a central location for all support functions at the INEL and outlying services will be consolidated there.

- While some existing missions will continue in the near term at TAN, no new future programs other than long-term remedial actions have been identified for the facility.

- The existing missions at the TRA are expected to continue into the foreseeable future (i.e., 20 years under the TSI document).

- The RWMC will experience rapid growth in the near term and sustain its level of operations in the long term.

- The PBF will experience growth in waste reduction research programs as well as programs in nuclear applications in medical research, such as brain cancer treatment technologies.

2.1.2 Idaho National Engineering Laboratory Reference Book

The Idaho National Engineering Laboratory Reference Book (DOE 1994a), prepared by DOE-ID for use by the Advisory Board Task Force on Alternative Futures for DOE National Laboratories, provides an overall future vision statement with respect to the future missions of INEL to solve critical problems related to the environment, energy production and use, United States economic competitiveness, and national security. These missions point to an increased emphasis on domestic research and development, both by DOE and through partnerships between DOE and private industry. Some of the major strategic goals stated in the document include the following:

- The INEL will continue to develop technologies that help solve problems facing resources-based industries and enter into partnerships with resource-based private industry and business.

- The advance technological capabilities of INEL applied in partnership with industry, universities, and other national laboratories will provide future contributions in advanced manufacturing techniques.

- The INEL will continue its leadership role in the DOE spent nuclear fuel program.

- The INEL will continue to develop environmental technology capabilities in safety and risk assessment; materials, biological, and chemical processing technology; and remote handling and process automation.

- The INEL will continue to expand alternative energy supply and energy efficiency research such as hydropower and geothermal-generated electricity as sources of renewable energy.

- The INEL will be increasingly involved in transportation technology development such as alternative fuels for transit vehicles and prototype mass transit and "smart highway" technologies.

2.1.3 INEL Institutional Plan: FY 1993 to FY 1998

This five-year plan provides a general overview of INEL facilities and outlines strategic program directions and initiatives. Specific and technical programs, including ER&WM, are identified and addressed in the five-year plan. Information relevant to land use issues is contained in the "Site and Facilities" section, which outlines major construction projects, general purpose capital equipment needs, and other plans guiding facility development through 1998. Brief descriptions of each construction project construction scheduled within the 5 years are included in the INEL Institutional Plan (DOE 1993c).

While the INEL Institutional Plan provides information to formulate assumptions on future development in all major facility areas at the site, it specifically provides information on NRF, ICPP, and ANL-W, which are not covered under the INEL Site Development Plan. Under this plan, each of these facilities would become integral parts of the DOE's spent nuclear fuel program, providing storage capacity, treatment, and research/development in the management of spent fuel.

2.1.4 INEL Environmental Restoration and Waste Management Program

The ER&WM program implements planning processes to develop and achieve program objectives and meet regulatory requirements. The processes include site-specific planning, roadmapping, and preparing Environmental Impact Statements (EISs).

The purpose of the Site-Secific Plan for Fiscal Year (FY) 1993 (SSP) is to outline how DOE's nationwide ER&WM Five-Year Plan for FY 1994 through FY 1998 will be implemented at INEL. The Five-Year Plan provides the framework for bringing all DOE waste-related activities into compliance with applicable state and federal regulations and addresses ongoing waste-managing activities. The plan also describes DOE's program for achieving its goal of cleaning up contamination at CERCLA-related sites at INEL by the year 2019 (DOE 1993a).

The SSP provides an overview of waste issues at INEL, outlines public involvement in ER&WM activities, addresses ongoing corrective activities, and identifies and describes current and proposed ER&WM activities. The SSP also provides information about the technology development program, National Environmental Policy Act (NEPA) requirements for environmental assessments (EAs) and EISs, and the quality assurance plan (QAP). The discussion of the environmental restoration program, which is responsible for cleanup of currently contaminated areas, is pertinent to land use issues at INEL, as is the document's discussion of waste management activities that will require construction of new or expanded treatment facilities.

"Roadmapping" is an important part of the DOE-ID strategic planning efforts. The roadmap process compares the "installation as it presently exists" with "the installation as DOE wants it to exist" and then identifies the issues that separate the two. The process defines global issues and potential resolutions that could affect or hinder DOE-ID's ability to achieve long-term objectives. The roadmaps will be used to update INEL's next ER&WM five-year planning process. Land use was identified as an issue to be addressed (DOE 1993a).

Currently, DOE-ID has released a draft EIS pursuant to NEPA requirements and DOE policy (DOE 1994b). The Programmatic Spent Nuclear Fuel and INEL EIS analyzes the potential impacts of INEL ER&WM projects proposed for the next five to ten years. The EIS also compares those impacts to impacts which would result in different alternatives. The constraint analysis and future scenarios presented in this Long-Term Land Use Future Scenarios document provides input for the land use impact analysis included in the draft EIS.

2.1.5 Decontamination and Decommissioning Program

DOE's Decontamination and Decommissioning (D&D) program formulates basic policies associated with the ultimate disposition of surplus facilities. To the extent practical, the D&D program strives to convert INEL facilities to a reusable condition or restore the land to its natural state. An understanding of the D&D process in determining long-term land use scenarios is important because it provides additional input into the priorities and timeframes associated with possible reuse of current facility areas.

After a facility ceases operations, but prior to its being accepted into the Decontamination and Decommissioning Program, it enters the Facility Transition Program. The purpose of this program is to provide a consistent approach to determine whether a facility is available for reuse or a candidate for decontamination and decommissioning. This phase consists of (a) termination of facility operations; (b) placement of the facility on the Surplus Facilities List, if no other mission is identified; (c) establishment of a surveillance and maintenance program to monitor the remaining known hazards and to maintain the facility in a safe condition; (d) achievement of safe shutdown/deactivation; and (e) transfer of the facility to the DOE Office of Environmental Restoration.

DOE has established three basic modes of decommissioning facilities: protective storage, entombment, and dismantlement. Each mode is associated with a different level of decontamination and potential for reuse (DOE 1993b).

Protective Storage. Under this mode, a facility is essentially left in place. Loose contamination is removed and temporary, but rigid, physical barriers are erected. Passive protective systems are established and constant surveillance is performed. Typically, most of the area around a facility is restricted from use; however, access to the immediate vicinity of the facility is not forbidden.

Entombment. Under this mode, a facility is also left in place. Loose contamination is removed, but permanent barriers are established. Ongoing remote facility surveillance is provided and direct surveillance is conducted periodically. The area in the immediate vicinity of the facility would be available for new uses, but restrictions may be established to prevent any potential compromise of the physical barriers. Most of the area around the facility is unrestricted to other industrial uses.

Dismantlement. Under this mode, a facility is fully decontaminated or the structures are removed. All areas are remediated to unrestricted levels. No surveillance is required and unrestricted reuse of the facility is possible after full decontamination.

DOE uses the protective storage mode as an interim solution to the D&D problem. As funding and technology become available, the excessed facilities would be dismantled or reused, if possible. Prioritization of D&D projects is based on the following criteria:

- DOE legal and contractual obligations
- Economic impacts of delayed versus immediate decommissioning
- Health risk of delayed decommissioning
- Future anticipated land uses
- Cost-effective program management
- Other special factors that may be unique to individual projects.

2.1.6 Site Selection Report for the New Production Reactor

The Site Selection Report for the New Production Reactor (NPR) provides information about the process and factors used to evaluate and select a site for a proposed new facility area (Spry and Moor 1989). The study was performed to help in the selection of a site for a new tritium and plutonium production facility. While this project is now defunct, the document serves as the most recent example of an analysis performed to select a new INEL production/research facility area. It incorporates all relevant legislative requirements and modern planning criteria that were available in 1989.

The NPR siting team identified a list of selection criteria to identify the most suitable site for the new facility among a list of alternatives at INEL. The team separated the criteria into "musts" and "wants". Musts, also referred to as "go/no go" criteria, were those criteria considered to be minimum requirements for site acceptability. Sites not meeting those requirements were eliminated from further consideration. The minimum selection criteria as they appear in the study are as follows:

1. Five miles to a capable fault
2. Outside volcanic exclusionary zone (5 mi for vents in rift zones and 3 mi for vents outside rift zones)
3. Above maximum Mackay Dam failure flood elevation
4. Meet legal (10 CFR 100) population density limits
5. One square mile or more in area
6. Environmentally acceptable (would not involve unique habitat or destroy endangered species)
7. Water availability of approximately 30,050 acre-ft/yr [18,600 gallons per minute (gpm)].

The wants, also referred to as differentiating criteria, included criteria considered to be desirable in a potential site. They were used to rank the sites meeting the minimum requirements. The site selection assigned factors to weigh each differentiating criterion according to its relative importance. The wants identified by the siting team are presented verbatim below in order of importance:

1. Minimize adverse interactions with existing facilities
2. Minimize the value of the safe shutdown earthquake (SSE) horizontal ground acceleration
3. Minimize environmental impact on biota
4. Maximize distance from volcanic exclusion zone
5. Maximize groundwater transmissivity

6. Maximize distance from public highways

7. Maximize distance from site boundaries

8. Minimize distance from DOE-acquired land

9. Minimize commuting distance

10. Minimize depth of wells for water supply

11. Minimize length of new roads

12. Minimize length of new railroad track

13. Minimize the length of new power lines

14. Minimize cost of new excavation (Spry and Moor 1989).

The NPR siting study also included an extensive analysis of seismic potential at possible sites for the new reactor facility. This analysis concluded that areas northwest of TAN exhibited a moderate risk of future earthquake activity capable of causing structural damage. The balance of the site area exhibited a lower risk of such occurrences (Spry and Moor 1989). The NPR Lemhi fault investigations produced a seismic threat map (see Appendix A, Natural Phenomena Committee). This map indicates that TAN is located closest to the Lemhi fault; siting criteria for nuclear reactors in 10 CFR 100, Appendix A may not be met at the TAN location.

Although the criteria developed by the NPR siting team identified several specific factors needed to assess potential locations for the new facility, the types of factors analyzed were specifically tailored to the program requirements of the NPR. Factors examined to develop the various land use scenarios presented in Section 5 were similar to those used in the NPR study, but criteria for the land use scenarios were based upon their value in identifying future locations for the development of generic projects. Projects with unique characteristics or requirements would require more rigorous or specific criteria.

2.1.7 Public Land Orders and Memoranda of Understanding

A series of PLOs and Memoranda of Understanding (MOUs) were reviewed with respect to land use and land use decision-making at INEL. Many of these documents provided information on potential uses and institutional control of lands currently under DOE jurisdiction.

INEL, as it is currently composed, was created through a series of withdrawals and purchases of federal, state, and private lands. Federal lands were withdrawn through PLO 318 (1946) and 545 (1949) which accounted for 123,419 acres; PLO 637 (1950) accounted for 233,242 acres; and PLO 1770 (1958) accounted for 123,419 acres. A total of 35,282 acres were acquired from the State of

Idaho and 24,627 acres were acquired from private owners.[a] Control of these lands was transferred from the U.S. Navy and the Bureau of Land Management (BLM) to the Atomic Energy Commission (AEC). A part of the AEC later became the Energy Research and Development Administration (ERDA), and ERDA subsequently became the DOE.

The PLOs provided for certain responsibilities to remain with the BLM. These responsibilities include:

- Administration of grazing permits on INEL
- Granting of utility rights-of-way across INEL
- Extraction of materials
- Wildfire control, weed/insect control, and predator control.

The PLOs require that the DOE be consulted prior to final decisions regarding these responsibilities and any resulting actions, however.

MOUs signed by the AEC and the BLM in 1950, 1958, and 1972 and subsequently accepted by the ERDA and DOE, define how the two agencies exercise their respective responsibilities (AEC 1950, 1958, 1972). Of particular interest to the projection of the long-term land use scenarios the MOUs define the limits of the INEL grazing buffer and outline responsibilities of the two federal agencies regarding permitted activities in the grazing buffer.

2.1.8 Regulatory Overview for Land and Surplus Planning

The Regulatory Overview for Land and Surplus Planning (ROLSP) was prepared by the DOE Office of ER&WM, Office of Program Support. According to DOE Order 4300.1C (DOE 1992f), "Real property holdings of DOE and its contractors must be united to the minimum required to accomplish assigned missions. Real property is excess when it is not needed to fulfill current requirements and DOE has no need for it in the foreseeable future." The ROLSP provides guidance on the mechanisms through which DOE can dispose of surplus property and presents the legal provisions which affect such disposals (DOE 1992c). The Long-Term Land Use Planning Team consulted the ROLSP to review the process and timeframe through which lands could be transferred from DOE ownership for other uses should they no longer be required by INEL.

The ROLSP describes the process required to dispose of real property owned by DOE, including property purchased from private land owners and property withdrawn from the public domain. According to the ROLSP, property may be transferred only after it is determined that it will be of no future use. In addition, extensive supporting documentation must be prepared before the property may be transferred. The land at INEL that was originally obtained from private owners and the state must first be transferred to the General Services Administration (GSA) for transfer to another government agency or sale to the public. According to the guidelines outlined in the ROLSP, former public land attained via PLOs must be returned to the BLM to be managed for multiple use (e.g., grazing, mineral extraction, recreational, etc.) and/or further disposition (DOE 1992e).

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a. DOE is currently conducting research to determine the specific location(s) of private land and state land acquired in the assemblage of INEL.

2.2 Concerns of the Participation Forum

A Participation Forum was established in December 1992 to incorporate regional considerations into the development of long-term land use scenarios. The Participation Forum included professional planners and representatives of local counties; regional, state, and federal agencies; and the Shoshone-Bannock Tribes. Objectives of the Participation Forum were to:

- Provide DOE with the opportunity to inform regional planning professionals and interested agencies of the purpose and need for a long-term land use scenarios document for INEL and apprise them of the approach used to develop the document

- Gather input from regional planning professionals concerning relevant issues including key assumptions, available reference documents, particular areas of concern, and goals to be incorporated into the document

- Provide regional planning professionals with the opportunity to review and offer input to the long-term land use scenarios document, once available.

The first meeting of the Participation Forum was held December 1, 1992, in Idaho Falls. A record of the discussion, called a "group memory," is included as Appendix D. In general, the results of the discussion were used to help the planning team perform the following:

- Complete a comprehensive list of key documents relevant to INEL and the surrounding lands as recommended by Participation Forum members

- Develop a list of planning assumptions incorporated in regional planning processes regarding trends in land uses, development, recreation, and traffic within the five neighboring counties and nearby federal and state public land

- List goals and issues of concern and that the Participation Forum members felt should be addressed in the long-term land use scenarios document.

2.3 Regional Development Characteristics

The Long-Term Land Use Team reviewed county and state planning documents to determine development trends in the region surrounding INEL. This review was supplemented by comments provided by the Participation Forum. Information obtained from the documents and forum was used to project and analyze how a future withdrawal of INEL land might be developed (e.g., residential, agricultural, recreational).

The INEL site is primarily located within Butte County, yet portions of the site are also located within Bingham, Jefferson, Bonneville, and Clark counties. Predominant development characteristics associated with each county are provided below.

Butte County. Land use within Butte County is primarily rangeland (64.8%), with barren land (20.8%), forested land (8.3%), and farm land (6.1%). Currently, 86.3% of the county is owned by

the federal government, including INEL, Challis National Forest, and Craters of the Moon National Monument (Butte County 1991). The population was 2,918 in 1990, with a density of 1.3 persons per square mi (mi^2) (U.S. Dept. of Commerce 1992). Residential land uses are minimal and account for only 0.1% of the county. Residential land use is concentrated in and around the communities of Howe and Arco.

Jefferson County. Land use in Jefferson County is primarily farm land (37.8%), with barren land (31.6%), and rangeland (26.9%). Currently, 48.7% of the county is owned by the federal government (Jefferson County 1988). The population was 16,543 in 1990, with a density of 15.1 persons per mi^2 (U.S. Dept. of Commerce 1992). Residential uses accounted for 1,700 of the county's total 709,800 acres and are concentrated in and around the communities of Mud Lake, Terreton, Roberts, Rigby, and Ririe.

Bingham County. Land use in Bingham County is composed primarily of rangeland (46.8%), farm land (31.7%), barren lands (14.9%), and forested land (3.8%). Private landowners hold 58% of the land in the county, while 29.4% is owned by the federal government (Bingham County 1986). The population was 37,583 in 1990, with a density of 17.9 persons per mi^2 (U.S. Dept. of Commerce 1992). The community of Atomic City is the closest residential population to INEL, with a population of 25 in 1990.

Bonneville County. Land use in Bonneville County is composed primarily of forested land (32.6%), with farm land (29.2%), rangeland (27.8%), and barren land (5.5%). The federal government owns 52.6% of the county lands (Bonneville County 1991). The population of Bonneville County was 72,207 in 1990, with a density, 39.2 persons per mi^2. Of the five counties surrounding the INEL, Bonneville County is the most densely populated. Residential development is concentrated around the City of Idaho Falls and the City of Ammon (U.S. Dept. of Commerce 1992).

Clark County. Land uses in Clark County is primarily rangeland (76.5%), with forest land (15.5%); and farm land (7.4%). Federal lands account for 66.1% of the county, including the Challis and Targhee National Forests. The population was only 762 in 1990, with a population density of 0.4 persons per mi^2. (U.S. Dept. of Commerce 1992). Residential uses within Clark County are concentrated primarily in the community of Dubois.

Overall, INEL's remote location minimizes the likelihood of significant residential development or other types of development (i.e., commercial or industrial) occurring on or in close proximity to the site. The comprehensive plan associated with each county areas accepts development adjacent to previously developed areas, which minimizes the need to extend infrastructure improvements and avoids sprawl. Because INEL is remotely located from developed areas, with the exception of Howe and Atomic City, INEL lands do not factor into the counties' planning policies. Moreover, significant portions of lands adjacent to INEL are federally owned; therefore, they are precluded from private development such as residential or commercial use (DOI 1979, 1981a, 1981b, 1984).

The INEL employed 12,803 contractor and government personnel in January 1992 and is the largest employer in the region surrounding the site (DOE 1994b). Despite that fact, INEL has not generated any significant residential development in close proximity to the site. Most employees live in the City of Idaho Falls (Zelus 1991), the closest community which provides the necessary amenities to support a population base, including housing, schools, and services.

INEL's importance to the regional economy suggests that a reduction or cessation of operation would result in a reduced demand for residential development in the region. Three of the comprehensive county plans contained population projections that are tied to assumptions about INEL activities (Bingham County 1986, Butte County, n.d, Bonneville County 1991). Comments made by Participation Forum participants did not suggest that any significant new residential development is anticipated in the immediate vicinity of INEL. However, the participants expected an increase in recreational land uses, exhibited by increased visitation to the Craters of the Moon National Monument and an increase in demand for wilderness recreation. Agricultural uses were also expected to increase as rangeland is converted to cropland, depending on irrigation limitations of the land.

3. SITE CHARACTERISTICS AND DEVELOPMENT CONSTRAINTS

This section presents site environmental and development constraints that would influence the location of future land use activity at INEL. These characteristics are illustrated in the INEL Environmental and Development Constraints Overlay Map Series (see Appendix B). The information contained in the map series was developed using Arc/View 6.1 Geographic Information System (GIS) software based on information derived from a variety of data sources within the ERIS database. Table 3-1 presents the sources of data used to develop the overlays.

The INEL Spatial Analysis Laboratory, operated by the Environmental Restoration and Waste Management Computing Unit, develops and maintains the GIS databases for INEL. The data sets utilized by the GIS actually belong to the organizations which fund their development and responsibility for quality assurance (QA) ultimately rests with the same entities.

The Spatial Analysis Laboratory has drafted quality assurance (QA) procedures to document the quality of the underlying GIS data sets. An automated system for reporting data sources and associated data set quality information has been established to document information such as: data origination, scale, projection, generic quality assessments by the receiving or developing analyst, digitizing information, known problems, revisions, and many other types of data.

The GIS consists of digitized data with accurate location information and allows presentation of selected data in various scales as authorized by the entity in control of the desired data sets. Users may request presentation on paper or clear media.

For the purposes of this report, a base map was developed presenting information on the existing facility areas and infrastructure. Clear plastic overlay maps present information on various environmental and development constraints. The overlays are designed to be used individually or in any combination of interest to the reader.

Project managers may wish to utilize the information presented in this document to screen potential project sites. If the scale of the overlays is too small to conduct such a screening process, larger scales can be projected by the Spatial Analysis Laboratory upon request. Additionally, a project manager could request only those environmental and development constraints which would be compelling in siting a particular new project.

The following sections provide additional information on the base map and overlays.

3.1 Existing Land Use and Infrastructure

The base map in the Overlay Map Series provides geographic locations for all facility areas of INEL. It includes INEL boundaries and the road, railroad, and electrical power line infrastructure at the site. The base map also provides a legend for the six constraint map overlays to be used in conjunction with the base map.

Table 3-1. Data Sources for Site Characteristics and Development Constraints.

Map and Map Units	Data Sources
Existing Land Use & Infrastructure	DOE INEL Technical Site Information Document
Water Resources & Flood Areas	
Streams	Idaho Department of Water Resources Maps (1990)
Flooding Areas	K. Koslow (1985)[b]
Candidate Wetlands	U.S. Fish and Wildlife Service Candidate Wetlands Inventory Maps (1992)[c]
Reno Ditch	U.S. Geological Survey, Scott Butte and Snaky Canyon Quad Maps (1987)
Surficial Materials	U.S. Geological Survey Revised Geological Map of the Idaho National Engineering Laboratory (1990, 1992)[d]
Contaminated Areas	
Ordnance Impact Area and Surface Contamination Areas	Data provided by R. Taft (DOE-ID) and N. Ricks (Scientech) using U.S. Navy and Air Force Documents.
Environmentally Controlled Areas	Unpublished EG&G Idaho Data (1992)[a,e]
Archaeological/Cultural Resources	
500-meter wide zone along Big Lost River, Birch Creek, and Sinks and 1-km wide along Lava Ridges and around buttes, craters, and caves	INEL Archaeological Research Laboratory (1993)
National Historic Landmarks and Goodales Cutoff	National Register of Historic Places (1993)[c]
Ecologically Sensitive Areas	Radiological & Environmental Sciences Laboratory (1993)[c,f]
INEL Neighbors	
Bureau of Land Management, National Forest, state, and private lands and grazing permit buffer land	BLM Resource Management Plans[c]
Cultivated versus noncultivated status for private lands	Idaho Department of Water Resource Maps 1990[a]

a. Based on data provided by the Idaho Department of Transportation survey notes and construction drawings, MK-FIC maps and survey notes, U.S. Department of Navy Drawings, and data provided in "Leaps and Bounds," *Federal Register*, Vol. 48, No. 212, p. 503891.
b. Used DAMBREAK computer codes for probable maximum flood based on failure of Mackay Dam.
c. Digitized data from map, clipped to INEL boundary.
d. Map only shows areas with significant constraints, categories were condensed to facilitate analysis.
e. Locations identified using flyover data.
f. Data provided by T. Reynolds, DOE-ID.

Existing land use at the INEL is divided into nine distinct, geographically separate facility areas. Each area was established to perform specific programmatic and/or support activities. In addition, certain site-wide land uses occur outside these facility areas. For purposes of ER&WM activities, these site-wide land uses and facility areas are further designated as waste area groups (WAGs) under the FFA/CO. Descriptions of the facilities contained in each facility area are provided below, and each is illustrated on the base map.

3.1.1 Site-Wide Land Uses at the INEL

Grazing/Agriculture. A significant portion of the INEL is utilized for grazing purposes. The acreage allocated for grazing at INEL are mutually agreed on by DOE and U.S. Department of the Interior (DOI). The DOI administers the area through BLM grazing permits. Grazing is not allowed within 2 mi of any nuclear facility, and dairy cattle are not permitted. The area used for grazing is usually between 300,000 and 350,000 acres (Berain 1992). The U.S. Sheep Experiment Station, which is located approximately 42.6 kilometers (26.5 mi) northeast of the site, has the use of a 900-acre portion of INEL for a winter feed lot for approximately 5,000 sheep (Weller 1992).

Resource-Based Recreational Uses. The INEL also supports periodic uses associated with onsite resources. For example, the Experimental Breeder Reactor I (EBR-I) is a national historic landmark and houses a visitor center that is open for tours by the public between the weekends of Memorial Day and Labor Day. In addition, the INEL occasionally supports controlled hunting within the site boundaries. Each year the Idaho Department of Fish and Game and DOE determine whether or not to allow controlled hunts of wild game populations living on INEL property (DOE 1989). The expressed purpose of the hunts is to reduce potential migration of animal populations off INEL property onto private lands where crops may be damaged. Therefore, each year, all wild game populations on INEL are evaluated to determine if such controlled hunts are warranted. Since 1992, such hunting has been restricted to areas within 0.5 mi of the INEL boundaries and to certain seasons (Naderman 1992).

National Environmental Research Park Uses. The entire INEL is designated as a National Environmental Research Park (NERP). Several uses that are associated with this designation occur onsite. The site's ecosystem provides a controlled outdoor laboratory where scientists from all fields can study natural environment changes caused by human activities. Since INEL has a number of facilities capable of producing stresses on the environment, sitewide studies of these stresses and potential mitigative measures are conducted to provide opportunities for significant research. A substantial body of information on geology, hydrology, wildlife, vegetation, and meteorology has been collected, with certain baseline information dating back over 40 years.

Under the FFA/CO, all nine major facility areas of the INEL are designated as WAG 10. WAG 10 includes miscellaneous surface sites and liquid disposal areas throughout the INEL that are not included within other WAGs. WAG 10 also includes the regional Snake River Plain Aquifer concerns related to INEL that cannot be addressed on a WAG-specific basis. Specific sites currently recognized as part of WAG 10 include:

- Liquid Corrosive Chemical Disposal Area (LCCDA)

- Organic Moderated Reactor Experiment

- Former ordnance areas, including the Naval Ordnance Disposal Area (NODA) and other ordnance areas located at numerous sites within the INEL (See Section 3.4.1).

Surface and subsurface contaminants being investigated at these sites include radionuclides (americium-241, cesium-137, cobalt-60, uranium-234, uranium-235, uranium-238, strontium-90, plutonium-239, plutonium-240), metals (barium, cadmium, chromium, and lead), and organics (benzene, toluene, xylene).

3.1.2 Existing Major Facility Areas

Test Area North. Test Area North (TAN) is located in the northern portion of INEL. Originally established in the 1950s to support the Aircraft Nuclear Propulsion (ANP) Program, the facility currently supports the Specific Manufacturing Capability (SMC) program. This program includes development and production of armor for the United States Army's M1A1 Abrams tank program. Other facilities at TAN include one of the world's largest hot shops, storage pools, and examination operations for fuel and reactor parts associated with the 1979 Three-Mile Island accident (DOE 1991c).

Under the FFA/CO, TAN is designated as WAG 1. It encompasses several subareas:

- The Technical Support Facility (TSF)
- The Initial Engine Test (IET) Facility
- The Final Engine Test Facility (formerly Loss-of-Fluid Test [LOFT] Facility);
- The Contained Test Facility (CTF) and the SMC Facility
- Water Reactor Research Test Facility (WRRTF).

In general, TSF consists of facilities for handling, storage, examination, and research and development of spent nuclear fuel. The Process Experimental Pilot Plant (PREPP), a facility originally built to determine the capabilities of processing transuranic waste destined for WIPP, is also located here. Potential release sites addressed under the FFA/CO include tanks, spills, disposal sites, and wastewater disposal systems (e.g., sumps, tanks, injection well, ponds, and lagoons). Surface and subsurface contaminants at the TSF area include radionuclides (cesium-137, cobalt-60, and strontium-90), metals (i.e., barium, cadmium, chromium, mercury, and silver), and volatile organic compounds (VOCs) (benzene, toluene, ethylbenzene, xylene, and trichlorethylene).

The IET is an abandoned facility north of TSF that has numerous historical uses. IET was designed as a testing location for the nuclear jet engines developed under the ANP Program. The few IET sites being investigated under the FFA/CO are tanks still in place, an old injection well, and rubble disposal sites. Surface and subsurface contaminants at the IET area include radionuclides (cesium-137, cobalt-60, strontium-90 and uranium isotopes), metals (mercury and silver), and VOCs (i.e., benzene, toluene, ethylbenzene, and xylene).

CTF and SMC are contiguous facilities west of TSF that consist of structures built for those two operations and buildings remaining from the ANP Program. CTF is a decommissioned facility constructed for nuclear reactor tests. SMC is an active facility manufacturing components for the

M1A1 Abrams tank program. The sites being investigated include pits, tanks, a wastewater disposal pond, and two small historic spill sites. Surface and subsurface contaminants at the CTF and SMC areas include metals (chromium), and VOCs (benzene, toluene, ethylbenzene, and xylene).

WRRTF primarily consists of two buildings southeast of TSF that have housed several nonnuclear tests, mostly for simulating and testing water systems used in reactors. The WRRTF sites being investigated include tanks, wastewater ponds, an injection well, a burn pit, and a sewage lagoon. Surface and subsurface contaminants at the WRRTF area include radionuclides (cobalt-60) and VOCs (benzene, toluene, ethylbenzene, xylene, and trichloroethylene).

Test Reactor Area. The Test Reactor Area (TRA) is located in the southwestern portion of INEL. Established in the early 1950s, TRA houses extensive facilities for studying the effects of radiation on materials, fuels, and equipment. The main program at TRA involves the Advanced Test Reactor (ATR), which is used to test materials under reactor conditions and to produce radioisotopes used in medical applications, research, and industry (DOE 1993b).

TRA is designated as WAG 2. TRA sites being investigated under the FFA/CO include pits, tanks, rubble piles, ponds, cooling towers, wells, french drains, and spills. One of the higher priority sites within TRA is a percolation pond that has been used for the disposal of radioactively contaminated wastewater. Surface and subsurface contaminants at TRA include radionuclides (cobalt-60, cesium-137, uranium-234, uranium-238, strontium-90, and tritium), polychlorinated biphenyls (PCBs), organics, and metals (arsenic, mercury, chromium, and barium).

Idaho Chemical Processing Plant. The Idaho Chemical Processing Plant (ICPP) is located approximately 2 mi east of TRA. The original mission of the ICPP was to reprocess spent reactor fuel elements to recover highly enriched uranium. The facility is no longer reprocessing spent nuclear fuels; in 1992 the mission was changed to include the following: providing safe interim storage of spent nuclear fuels; providing research and development (R&D) support for the disposition of these fuels in a federal geologic repository; managing other high level wastes; managing wastes from past reprocessing and D&D activities; and developing improved waste management techniques. Facilities at the ICPP include spent fuel storage and reprocessing facilities, a waste solidification facility, remote analytical laboratories, related storage bins, and a coal fired steam generating plant (DOE 1993a).

Under the FFA/CO, ICPP is designated as WAG 3. ICPP sites being investigated include facilities associated with wastewater disposal systems (e.g., sumps, ponds, and an injection well), spills, tank farm storage of hazardous substances, and transfer of high-level liquid waste. Surface and subsurface contamination at these sites include radionuclides (americium-241, cesium-137, uranium-234, uranium-235, uranium-238, plutonium-238, plutonium-239, and strontium-90), inorganics (nitrates, mercury, and arsenic), and organics.

Central Facilities Area. Many technical and support services for the INEL site are located within the Central Facilities Area (CFA). This area is the principal location for communications systems, bus service, food service, vehicle and equipment pools, medical facilities, warehousing, radiation monitoring, and other administrative functions.

The Radiological and Environmental Sciences Laboratory (RESL) is also at CFA. RESL provides specialized individual health protection including personnel and environmental radiation dosimetry,

whole-body counting, and radiochemical analysis. RESL also conducts ecological monitoring and continuous sampling of air, soil, water, milk, wheat, potatoes, and lettuce to ensure that nuclear operations at the site are environmentally safe. Other CFA facilities include offices that support operations of the National Oceanic and Atmospheric Administration (NOAA), which operates an aircraft testing facility, and the United States Geological Survey (USGS), which conducts hydrogeological monitoring from facilities located here.

Under the FFA/CO, CFA is designated as WAG 4. CFA sites being investigated include historical spills, tanks, landfills, ponds, leach fields, and leach pits. The boundary of WAG 4 is loosely defined as CFA does not have an enclosing fence. However, many CFA sites being investigated under are adjacent to buildings (e.g., tanks and dry wells). Others, including landfills and a gravel pit adjacent to one of the landfills, are located just outside the CFA. The WAG includes all surface and subsurface areas. Surface and subsurface contaminants at these sites include metals (barium, cadmium, chromium, mercury, and lead) and organics [benzo(a)pyrene].

Power Burst Facility/Auxiliary Reactor Area. The Power Burst Facility (PBF) is located approximately 6 mi northeast of the CFA. The original purpose of the PBF was for Special Power Excursion Reactor Tests, which were severe damage tests of nuclear fuels and materials used in reactors. This facility is currently being considered for a cancer research and treatment program. The reactor support facilities are currently being used for waste management related research, including the development of radioactive waste volume reduction techniques and waste immobilization research.

The PBF has four major facilities: the Waste Experimental Reduction Facility (WERF), which was designed to treat low-level and mixed low-level waste for volume reduction and removal of RCRA (RCRA) hazardous waste; the mixed Waste Storage Facility, which provides temporary storage for mixed low-level waste; the WERF Waste Storage Building, which stores waste awaiting treatment in the WERF and augments the capacity of the mixed Waste Storage Facility; and the Waste Engineering Development Facility, which is used for treatment, decontamination, and technology development activities (DOE 1994b).

Near the PBF is the Auxiliary Reactor Area (ARA). It is composed of four areas—ARA-I, ARA-II, ARA-III, and ARA IV. ARA was established in 1957 as a working area to develop a mobile, compact power reactor with minimal shutdown and startup time. ARA was phased out in 1965. Support buildings are now vacant except for intermittent small-scale testing programs (DOE 1991c).

PBF/ARA is designated as WAG 5. PBF/ARA sites being investigated under the FFA/CO include tanks and components of wastewater disposal systems (e.g., evaporation ponds, percolation ponds, leach fields, pits, and dry wells). Surface and subsurface contaminants at these sites include radionuclides (cesium-137, cobalt-60, europium-152, europium-154, europium-155, americium-241, plutonium-239/240, uranium-234, uranium-235, uranium-238, and strontium-90), metals (barium, beryllium, chromium, nickel, silver, and zinc), VOCs (1,1-dichloroethene, trichloroethene, tetrachloroethene, and toluene), semivolatile organic carbons (diethylphthalate) and PCBs.

Experimental Breeder Reactor I/Boiling Water Reactor Experiment. EBR-I was the first nuclear reactor in the world to produce usable quantities of electricity for domestic consumption. No longer in operation, the facility is designated as a national historic landmark (DOE 1991c). Near this facility is the Boiling Water Reactor Experiment Area (BORAX). This area originally included five separate experimental reactors, which are currently not used and are being or have been decontaminated and decommissioned.

Under the FFA/CO, these sites are designated as WAG 6. EBR-I/BORAX sites being investigated are primarily old tanks, but also include a small spill area and several liquid and solid waste disposal locations. Surface and subsurface contaminants at these sites include radionuclides (americium-241, cesium-137, cobalt-60, uranium-234, uranium-235, uranium-238, strontium-90, plutonium-239, and plutonium-240), metals (barium, cadmium, chromium, and lead) and organics (benzene, toluene, and xylene).

Radioactive Waste Management Complex. The Radioactive Waste Management Complex (RWMC) is located approximately 7 mi southwest of CFA. It provides waste management support for various high-tech radioactive waste processing, storage, and disposal strategies. The area houses the Stored Waste Examination Pilot Plant (SWEPP) used for certifying and examining defense waste for shipment to the DOE Waste Isolation Pilot Plant (WIPP) in New Mexico (DOE 1991c).

The Subsurface Disposal Area (SDA) is located at the RWMC and includes numerous pits, trenches, and vaults where radioactive and organic wastes were placed as well as a large pad where waste was placed above grade and covered. In addition, the Transuranic Storage Area (TSA) within the RWMC has been used since the early 1970s for retrievable storage of transuranic waste on earthen-covered pads and in facilities.

Under FFA/CO, the RWMC is designated as WAG 7. The primary site being investigated is the SDA. The boundary of WAG 7 is clearly defined as the RWMC fence, with the SDA as a fenced portion within the RWMC. It includes all surface and subsurface areas. Surface and subsurface contaminants at these sites include radionuclides (americium-241, cobalt-60, chromium-51, cesium-137, hydrogen-3, iron-55, nickel-63, plutonium-241, and strontium-90), metals (silver, beryllium, cadmium, antimony, and lead) and organics (acetone, carbon tetrachloride, methylene chloride, and toluene).

Naval Reactors Facility. Located approximately 11 mi north of CFA, the Naval Reactors Facility (NRF) is a research and development facility that is part of a joint effort between DOE and the United States Navy Nuclear Propulsion Program under the jurisdiction of the DOE-Pittsburgh Naval Reactors Office. NRF includes training facilities for naval officers and crew for the operation of reactors for the U.S. Navy (e.g., submarine personnel) (DOE 1991c). NRF also supports research and development efforts on reactors materials by preparation and examination of irradiation test specimens and by examination of expended fuel from Naval reactors.

Under the FFA/CO, NRF is designated as WAG 8. NRF sites being investigated include landfills, old spills, wastewater disposal systems (e.g., ponds, ditches, basins, drains, and drain fields) and storage areas. Possible contaminants include metals (barium, chromium, copper, lead, mercury, nickel, silver, and zinc), organics (hydrocarbons, paints, pesticides, PCBs and solvents) radionuclides, and petroleum products.

Argonne National Laboratory–West. ANL-W is located approximately 20 mi east of the CFA. It provides basic support of breeder reactor R&D. EBR-II, the only power-producing breeder reactor in the country, is located at ANL-W (DOE 1993a). In addition to EBR-II, the ANL-W complex has four other reactors and two fuel examination facilities.

Under the FFA/CO, ANL-W is designated as WAG 9. ANL-W sites being investigated include tanks and wastewater handling/disposal systems such as ditches, ponds, pits, drains, etc. Contaminants at these sites include metals (beryllium and chromium) and radionuclides (such as neptunium-237, cesium-137, strontium-90 and americium-241). The boundary of WAG 9 is basically the ANL-W fence; however, operations that extended or extend outside of the fence, such as the wastewater ditch, are included. WAG 9 includes all surface and subsurface areas described above.

3.1.3 Road Network

INEL has approximately 177 mi of paved roads within its boundaries (DOE 1993b). Of these, 87 mi are considered INEL service roads. The main artery road is Lincoln Boulevard, which runs north and south between TAN and CFA. Access on this road is limited to INEL employees and visitors on official business. Currently, two controlled access points exist at the northern and southern limits of the road. Access roads generally branch off of Lincoln Boulevard, with the exception of access roads for TAN, ANL-W, and RWMC which are connected to public rights-of-way.

Ninety of the 177 mi of paved roadway at INEL are devoted to public highways crossing the site (DOE 1993b). These roads are accessible by the general public and include:

- U.S. Routes 20 and 26, which cross the southern portion of the site
- Idaho Routes 22 and 28, which cross the northern portion of the site
- Idaho Route 33, which traverses the northern portion of the site from east to west.

(INEL roads are illustrated in red on the base map. Public highways are shown in purple.)

3.1.4 Rail Network

The Union Pacific Railroad Mackay Branch line provides service to the INEL via the Scoville Spur, which traverses crosses the southern portion of the site for 14 mi. Service is available to and from Butte (Montana), Pocatello (Idaho), and Salt Lake City (Utah) (EG&G 1991). Interconnections are possible from each of these points to provide service throughout the country. The branch line provides direct service to the RWMC.

DOE also maintains a rail line that passes north from the Scoville Spur to CFA, north to the NRF, and passes east of ICPP. A spur line runs from this track to the southern portion of ICPP. An additional, separate rail system services various areas within the TAN complex. Generally, the TAN system is utilized only for inter-facility rail traffic to and from the TAN Hot Shop complex. (Onsite rail lines are illustrated in black on the base map.)

3.1.5 Electrical Utility Lines

Power is supplied to INEL by two sources, the Idaho Power Company (IPC) and the EBR-II located at ANL-W. Approximately 60% of the power required to operate facilities at the INEL is provided by IPC; the balance is provided by EBR-II.

INEL has an extensive electrical transmission system which distributes electric power from both sources (DOE 1993b). The system was designed with a loop configuration that includes 56.5 mi of 138-kilovolt (kV) transmission line, an extensive system of secondary voltage feeder lines, and seven major substations with a cumulative transformer capacity of 122.6 megavolt amperes (MVA). The line configuration interconnects services at various locations on three main lines. An IPC line traverses the northern portion of the site from north to south (parallel to Route 22) and connects to the Antelope Substation east of CFA; INEL lines run from ANL-W west to the PBF, ARA, and CFA; and an additional line runs from CFA north to the ICPP, TRA, and NRF and terminates at TAN. (Onsite utility lines are illustrated in black on the base map.)

3.2 Water Resources and Flood Areas

3.2.1 Streams

INEL is located within the Mud Lake-Lost River Drainage Basin, a loosely defined, closed drainage basin (EG&G 1991). Surface water within the basin includes streams and creeks which drain the mountain watersheds north west of the site. The main watercourses that cross or are in the vicinity of the site include the Big Lost River which flows northeast from the Mackay Dam to an area south of TAN; the Little Lost River which flows from the northwest past the community of Howe and is diverted before reaching the site; and Birch Creek which flows from the northern portion of the site to a depression north of TAN. Several smaller streams in the southern portion of the site flow only occasionally following periods of excessive snowmelt or rainfall. (The Hydrography Overlay depicts onsite water resources in blue. Both perennial and intermittent streams are illustrated with blue lines.)

3.2.2 Flooding Areas

Most water in the streams traversing INEL are diverted for irrigation, power production, and/or flood control purposes prior to reaching INEL. The need for flood control at INEL was first recognized in the 1950s when TRA and ICPP were threatened by flooding as a result of ice jams on the Big Lost River. In 1958, a diversion area was constructed in the southwestern portion of INEL to divert high runoff flows from INEL facilities downstream (EG&G 1991). The area is composed of a dam, channel, culverts, dikes, and four spreading areas. However, localized flooding can occur at the INEL site when the ground is frozen and runoff from melting snow is combined with heavy spring rains.

Notwithstanding current INEL facilities and infrastructure designed for flood control, significant research has been conducted to determine areas subject to flooding. A 1986 study by Koslow and Van Haaften analyzed potential flooding that could occur as a result of a hypothetical failure of the Mackay Dam on the Big Lost River. The researchers examined the extent of flood inundation resulting from four different scenarios of the dam's failure:

- A seismic dam failure, resulting in a peak flow of 45,410 ft^3/sec (cfs) at the INEL diversion area

- A piping dam failure concurrent with a 100-year flood, resulting in a peak flow of 28,500 cfs at the INEL diversion area

- A piping dam failure concurrent with a 500-year flood, resulting in a peak flow of 45,900 cfs at the INEL diversion area

- A probable maximum flood (PMF) induced "overtopping" failure at the Mackay Dam, where stormwater runoff entering the reservoir behind the dam would greatly exceed storage capacity and spill over the top of the dam resulting in a peak flow of 71,850 cfs at the INEL diversion area (Koslow and Van Haaften 1986).

The extent of the projected floodplain under the PMF scenario encompasses both the 100- and 500-year flood scenarios. Water velocity during this event would range between 0.6 and 3 ft/sec with water depths ranging between 2 and 4 ft. Portions of two currently facility areas, TRA and NRF, and all of the ICPP are within the floodplain of a PMF. While this depth and velocity would not pose a major threat to existing structures, location of future land uses within these areas should be limited given the risk associated with this flood potential. (The Hydrography Overlay illustrates the probable maximum flood stage condition that would result from the projected worst case scenario in shaded blue.)

The 1986 Koslow and Van Haaften study also included a local basin snowmelt study. This study indicated a low potential for flooding from heavy rains and snowmelt runoff at the existing INEL site facilities. The combined rain and snowmelt were determined to be approximately 2.74 inches per day of available water (Koslow and Van Haaften 1986). This runoff could be diverted from facilities with properly installed culverts, channels, and flood control basins (DOE 1994b).

3.2.3 Candidate Wetlands

The Hydrography Overlay also presents areas identified as candidate wetlands associated with the Big Lost River channel and isolated wetland areas on the eastern portion of the site (EG&G 1993). These areas are currently being reviewed by the U.S. Fish and Wildlife Service (FWS) to determine if they meet the federal criteria for wetlands. Wetland areas provide natural drainage areas that can support a wide variety of unique habitats for flora and fauna. INEL's wetland areas are generally protected from encroachment by both applicable regulations. (Wetland areas are illustrated on the Hydrography Overlay with green.)

3.2.4 Groundwater

The INEL overlies the Snake River Plain Aquifer,[a] the largest aquifer in the State of Idaho (DOE 1994b). The aquifer is approximately 200 miles long, 30 to 60 miles wide, and covers an area of over

a. Because the Snake River Plain Aquifer underlies the entire INEL, it was not shown on the Overlay Map Series.

9,600 square miles (DOE 1993b). The INEL site (890 square miles) covers approximately 9% of the north-central portion of the aquifer. Water storage in the Snake River Plain Aquifer is estimated at 2 billion acre-feet (DOE 1993b; DOE 1994b). Depth to groundwater ranges from approximately 200 ft in northern portions of the site, to 900 ft in the southern portions. Groundwater flow in the aquifer is generally toward the south-southwest and the upper surface is primarily unconfined, or not overlain by bedrock or impermeable soil (DOE 1994b).

The Snake River Plain Aquifer is the source of all water used at the INEL. DOE holds a Federal Reserve Water Right for the site, which permits a water pumping capacity of 80 cubic feet per second and a maximum water consumption of 11.4 billion gallons per year for drinking, process water, and noncontact cooling. INEL site activities withdraw at an average rate of 2.03 billion gallons per year; however, approximately 65% of these withdrawals are eventually returned to the aquifer (DOE 1994b). Therefore, the annual net usage of water withdrawn from the aquifer is 710 million gallons per year (DOE 1994b). While existing capacity appears to be satisfactory for future development at the site, when DOE elects to allow non-DOE use of INEL lands or facilities, a decision will need to be made whether DOE will provide water or allow the non-DOE user to utilize DOE's water rights. Because water is available from the existing water right, DOE should require a proposed project to evaluate water requirements in its NEPA documentation for the proposed action.

In addition, the Snake River Plain Aquifer was designated by EPA as a sole-source aquifer in 1991, pursuant to the Safe Drinking Water Act (42 USC, Section 1427). Under the Sole-Source Aquifer Program (40 CFR 149), all projects receiving federal financial assistance (i.e., projects receiving financial benefits by a department or agency of the federal government but *not* projects or programs carried out by the department or agency itself) must be reviewed by EPA prior to the commitment of funds to ensure that the project would not contaminate a sole-source aquifer so as to create a significant public health hazard. This could prohibit DOE from allowing certain non-DOE uses of the INEL if the proposed project could significantly contaminate the Snake River Plain Aquifer and DOE's allowance to utilize the INEL site was considered to be "federal financial assistance."

3.3 Surficial Materials

The Surficial Materials Overlay presents a condensed version of sedimentary material types at INEL. These materials were identified to determine if these surficial characteristics could reasonably support non-INEL land uses such as cropland or residential use. This is based on a premise that non-DOE (i.e., private developers or farming interests) or other non-industrial users would not have the means to effectively address such constraints in utilizing these lands for residential or agricultural purposes when numerous other areas are more suitable in the region. The areas illustrated on the Surficial Materials overlay represent only those which would pose a significant constraint to siting a conventional development (e.g., less than 15 ft to basalt) or would pose impediments to agriculture (e.g., areas with moderate to severe irrigation limitations).

Surficial deposits at INEL consist of unconsolidated sediments of alluvial, lacustrine, eolian, and colluvial origin, and they cover all rock units at the site except the largely barren recent basalt flows (DOI 1990). Most of the soil series found at INEL are moderate to very deep soils. Although many of these soils are relatively deep, well-drained loams, most of the INEL is believed to have moderate to severe irrigation limitations (EG&G 1991).

The eight map units illustrated on the Surficial Materials Overlay are described below. It should be noted that individual titles for each map unit denotes the primary feature of each unit rather than all characteristics associated with it. For example, areas depicted under the loess map units also include information on underlying basaltic lava flows.

3.3.1 Fan Deposits

This map unit is composed of pebble- to boulder- gravel with a matrix of silty-sand to clayey-silt that is poorly sorted and crudely bedded. The fan deposits include materials deposited by streams and debris flows at the mouths of small drainage basins. The deposits occur on steeper slopes and include aprons of debris on slopes of the East and middle Buttes (DOI 1990). The fan deposits are subject to flooding and debris flows. Soils associated with this map unit have severe irrigation potential (EG&G 1993). (Fan deposits are illustrated on the Surficial Materials Overlay using yellow shading.)

3.3.2 Thin Sand Sheets

This map unit includes deposits of very fine to coarse eolian sand. The sheets vary in thickness from 3 to 15 ft and form northeast-trending longitudinal dunes. While largely stabilized, they also include some active areas of deflation and migrating sand (DOI 1990). (Thin sand sheets are illustrated on the Surficial Materials Overlay with diagonal green lines.)

3.3.3 Loess Unit 1

This map unit consists of basaltic lava flows and pyroclastic deposits. Materials are dark gray to black, unweathered to slightly weathered panhoehoe and a'a basalt flows and bedded, moderately oxidized scoria, cinders, and ash near volcanic vent areas (DOI 1990). The flows are highly irregular and covered with 0 to 3 ft of loess or eolian sand (DOI 1990). Soils associated with this map unit have irrigation limitations ranging from moderate to severe (EG&G 1993). (Loess Unit 1 is illustrated on the Surficial Materials Overlay with blue shading.)

3.3.4 Loess Unit 2

This map unit consists of basaltic lava flows and pyroclastic deposits that are covered irregularly by 0 to 10 ft of loess and eolian sand. Materials are light to dark gray, slightly to moderately weathered, and include panhoehoe and a'a basalt flows, and bedded, moderately to strongly oxidized scoria, cinders, and ash near volcanic vent areas. Many basaltic lava fields are included throughout this map unit (DOI 1990). Soils associated with this map unit have irrigation limitations ranging from moderate to very severe. (Loess Unit 2 areas are illustrated on the Surficial Materials Overlay using intermittent orange shading.)

3.3.5 Loess Unit 3

This map unit includes basaltic lava flows and pyroclastic deposits. Materials are light to dark gray and reddish-oxidized. The map unit includes slightly-to-strongly-weathered and hydrothermally altered panhoehoe and a'a basalt flows and moderately to deeply bedded oxidized scoria, cinders, and ash near volcanic vents. Flows are covered with 0 to 15 ft of loess and eolian sand (DOI 1990). Soils in

this map unit have severe irrigation limitations (EG&G 1993). (Loess Unit 3 areas are illustrated on the Surficial Materials Overlay with green shading.)

3.3.6 Colluvium

Colluvial deposits found on steep slopes (Holocene and Pleistocene) at the INEL and they are labeled as Colluvium on the Surficial Materials Overlay. This map unit consists of angular blocks (pebble to boulder) with a sparse, fine-grained matrix. The colluvium generally grades upslope into bedrock outcrops and downslope into alluvial fan deposits (DOI 1990). Soils in the map unit have very severe irrigation limitations (EG&G 1993). (Colluvium areas are presented on the Surficial Materials Overlay with red diagonal lines.)

3.3.7 Basalt

This map unit includes younger (less than 15,000 years old) basaltic lava flows. Materials include fresh, unweathered black to gray panhoehoe and a'a basalt flows. On the INEL, this map unit includes the basalt flows of the Cerro Grande (approximately 11,000 years old). The basaltic lava flows are covered by no more than 1 ft of soil. (Basaltic lava is illustrated on the Surficial Materials Overlay using black diagonal lines.)

3.3.8 Rhyolite Flows, Breccia, and Obsidian

This map unit includes deposits of tan to pink, flow-laminated rhyolitic lava flows and ranges from approximately 3 to 30 ft thick. The map unit includes the rhyolitic dome of the East Butte and the middle Butte. The middle Butte contains approximately 20 layers of basalt flows that are apparently uplifted in a piston-like fashion by a buried silicic intrusion of unknown age (DOI 1990). Soils in this unit have very severe irrigation limitations (EG&G 1993). (The rhyolitic flows, breccia, and obsidian are illustrated on the Surficial Materials Overlay with intermittent purple shading.)

3.4 Contaminated Areas

The Contaminated Areas Overlay illustrates the land areas within INEL that require remediation as a result of previous Department of Defense (DOD) and DOE activities. The Contaminated Areas Overlay organizes contaminated areas into three categories: ordnance impact areas, surface contamination, and environmentally controlled areas. The contaminated areas were examined based on the assumptions that additional time and costs would be associated with new development, and that DOE will retain control of the areas prior to remediation.

3.4.1 Ordnance Impact Areas

Large areas of INEL sustained ordnance contamination from the site's former use as a gunnery range used by the United States Army and United States Navy. Contamination (i.e., unexploded ordnance) in these areas is assumed to be intermittent, and technologies exist to appropriately remediate these sites for new development activities. Ordnance areas include the Naval Ordnance Disposal Area, the 5-in. and 16-in. Gun Ranges, and the former Army Bombing Range. (Ordnance impact areas are illustrated on the Contaminated Areas Overlay using pink shading.)

3.4.2 Surface Contamination Areas

INEL contains surface contamination that resulted from previous activities within current and former facility areas. Surface contaminants include petroleum products, acids, bases, solvents, radionuclides, polychlorinated biphenyls (PCBs), and asbestos (DOE 1993a). No immediate risk to the public, the workers, or the environment is currently known to exist at the INEL (DOE 1993a). However, many sites at INEL will undergo remediation to ensure that potential threats to public health and to the environment are addressed (DOE 1993a). (Areas with surface contamination are illustrated on the Contaminated Areas Overlay with pale yellow shading.)

3.4.3 Environmentally Controlled Areas

Other areas at INEL have been verified as containing contamination. Currently, some are being evaluated for possible contamination to surface and subsurface resources. These sites include storage tanks, dry wells, French drains, drainage ponds, spill areas, and other miscellaneous contaminated areas (EG&G 1993). (Environmentally controlled areas are illustrated on the Contaminated Areas Overlay with pale blue shading.[a])

3.5 Archaeological/Cultural Resources

Archaeological investigations have shown that cultural resources are numerous at INEL. Approximately 1,500 cultural resources have been identified after surveying only 4% of INEL's 890 mi^2. Significantly high numbers of additional resources can be expected to exist at INEL boundaries. The Archaeological/Cultural Resources Overlay presents areas at INEL that have a high probability of containing prehistoric resources and areas with historic significance. The zones presented on the overlay are approximate in nature and are subject to change based upon the quantitative analyses under way at the INEL Cultural Resource Management Office (Ringe 1993).

3.5.1 Sensitive Zones

The majority of cultural and archaeological resources at INEL are classified as prehistoric. The location of cultural resources reflects prehistoric hunting and gathering activities on the Eastern Snake River Plain. Due to their dispersed nature of the cultural resources, it is probable that the natural resources available on the desert were not sufficient to support permanent settlements (Ringe 1993). As a result, it is believed that the area containing INEL was formerly utilized by gathering societies and as a destination for hunting big game animals (including bison). Approximately 95% of the prehistoric resources at INEL are classified as "lithic scatters" containing little evidence of long-term settlement.

Three general geographic zones and sites that have the potential to contain cultural resources are delineated on the Archaeological/Cultural Resources Overlay. The first area coincides with the Big Lost River floodplain, which probably served as a prime area for hunting, fishing, and gathering. (This zone is illustrated on the Archaeological/Cultural Resources Overlay using red horizontal lines.)

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a. Some of the environmentally controlled areas are quite small. They appear on the Contaminated Areas Overlay as black dots because the scale of the map is too small to allow the blue shading to be visible.

The second zone includes the approximate edges of lava flow activity, which probably provided slight relief in the topography and suitable camp sites. (The second zone is illustrated using green horizontal lines.) The last resource area includes identified caves, buttes, and craters located at INEL. These sites are either protected by state law and/or were identified as sites with significant archaeological value. (These sites are illustrated using red asterisks.)

3.5.2 Registered Historical Sites

Currently, two INEL sites are listed on the National Register of Historic Places (NRHP). The first site, "Goodales Cutoff," was a northern spur of the Oregon Trail and was used by wagons as early as 1852.[a] The trail is still recognizable where it crosses the southwestern corner of the site. (The route of Goodales Cutoff is illustrated on the Archaeological/Cultural Resources overlay with a broken red line.) The second site is the EBR-I site, also located in the southwestern portion of the site.[b] (The EBR-I site is noted on the overlay with a black asterisk inside a circle.)

3.6 Ecologically Sensitive Areas

INEL contains diverse plant and animal species. The site is located within the northern desert shrub biome. More than 20 distinct plant communities have been identified. Those include communities dominated or co-dominated by sagebrush (*Artemisia* spp), juniper woodlands (*Juniperous* sp), and grassland. Wetland communities occur along watercourses, spreading areas, playas, and man-made ponds on the site. Sage grouse (*Centrocercus urophasianus*) are the most common game birds found on INEL (Reynolds 1986). In addition, INEL supports populations of nearly 40 species of resident mammals, including mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), and pronghorn (*Antilocapra americana*), as well as small mammals such as shrews (*Sorex* sp), bats, and rodents.

The Ecologically Sensitive Areas Overlay presents information on areas providing unique habitats for both plant communities and animals that occur at INEL. Most information for this map was provided by RESL who conducts ongoing ecological research, environmental surveillance, and analysis at INEL. RESL also administers the Idaho National Environmental Research Park program which establishes land within INEL boundaries as a protected outdoor laboratory for environmental research (Reynolds 1993).

3.6.1 Sensitive Biological Resource Areas and Buffer Areas

While no known year-round resident species reside at INEL which are classified as threatened or endangered by the FWS, the site provides winter habitat annually for bald eagles (*Haliaeetus leucocephalus*). Peregrine falcons (*Falco peregrinus*) are rare visitors to the site (Reynolds 1986).

The ferruginous hawk (*Butteo regalis*) is one of the most common nesting raptors on the site (Reynolds 1986). The Townsend's big-eared bat (*Plecotus townsendii*) is abundant on the site. Both

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a. Historians estimate that few people (if any) made the desert their final destination as they crossed the present day INEL.

b. See Section 3.1.1 for more information about EBR-I.

of these are classified C-2 species, or species under consideration for candidacy on the federal list of threatened and endangered species. Other C-2 species include the pygmy rabbits (*Brachylagus idahoensis*) and loggerhead shrikes (*Lanius ludovicianus*). The long-billed curlew (*Numenius americanus*) and painted milkvetch (*Astragalus ceramicus* var. *apus*) are categorized as 3-c species, or species which have proven to be more abundant or widespread then previously believed and/or are not subject to any identifiable threat.

In addition to the federally listed species, the State of Idaho has identified several species at INEL that are considered to be in need of protection (Idaho Code, Sections 18–3913 and 36–103.) These state-listed species include those identified by the FWS and the following additional plant species: winged-seed evening primrose (*Camissonia peterosperma*), large-flowered gymnosteris (*Gymnosteris nudicaulis*), spreading gilia (*Gilia polycladon*), king's bladderpod (*Lesquerella Kingii* var. *cobrensis*), and tree-like oxytheca (*Oxytheca dendroidea*).

Several areas have been identified on the Ecologically Sensitive Areas Overlay as having significant value for supporting sensitive and/or unique plant and wildlife species and communities on site (Reynolds 1993). The first of these is the area along the Big Lost River and Birch Creek. Riparian and wetland communities support a great variety of species. Buffer areas that define a reasonable area to protect these habitats have been identified (Reynolds 1993). (Sensitive biological resource areas are depicted on the ecological overlay using intermittent pink shading. Buffer areas appear as pink dotted areas.)

Some areas of the site have been identified as biological reference areas by RESL as having particular natural resource values. These biological reference areas and other areas exhibit a variety of nesting areas for hawks, maternity roosts for bats, and habitats for periodic gathering areas for elk, deer, and pronghorn (Reynolds 1993).

Two key research transects have been identified on the overlay that cross the center of the site from north to south and northwest to southeast. Vegetation data collected from these transects since 1949 provide crucial information pertaining to the impacts of INEL activities on the natural environment (Reynolds 1993). The undisturbed status of these areas is expected to continue. (The transects are depicted using the same pink shading that was used to illustrate the buffer for protected areas.)

Sites exhibiting sensitive biological resource value include buttes, caves, and crater areas. These areas were not illustrated on the ecological overlay because they were already depicted on the overlay depicting archaeological/cultural resources.

3.6.2 Sage Grouse Leks

Sagebrush habitats within the site are also important. The leks, consisting of areas of flat land and low sagebrush isolated from other areas, are identified on the Ecologically Sensitive Areas Overlay. These sensitive areas provide breeding habitats for sagegrouse residing on the site. (The sage grouse leks are illustrated using green flags on the ecological overlay.)

3.6.3 Pronghorn Wintering Area

The northern area of the site is at the mouth of north-south trending valleys and provides an important wintering area for pronghorn as well as sage grouse. The area's elevation, unique vegetation, and available water provide important winter habitat and ideal migratory corridor for pronghorn. The area also supports a significant concentration of sagegrouse leks (Reynolds 1993). (Brown diagonal lines illustrate the pronghorn wintering area on the ecological overlay.)

3.7 INEL Neighbors

The INEL Neighbors Overlay presents adjacent land ownership and use (cultivated and noncultivated), as well as areas within the INEL boundaries currently subject to grazing permits (DOE 1992d, EG&G 1993). This information was used as to assess possible non-INEL land uses that could reasonably occur if INEL property were transferred from DOE ownership.

3.7.1 Federal Land

Most land surrounding INEL is under the control of the federal government, including the National Forest Service and BLM. Land use on federal land includes multiple-use activities such as grazing, mineral and energy production, wildlife management, and recreational uses. (National Forest Service land is indicated on the INEL neighbors overlay with black crosses on a white background. BLM land is indicated using black horizontal lines.)

3.7.2 State-Owned Land

Relatively smaller areas of state lands are also adjacent to INEL (EG&G 1993). These areas are generally used for wildlife management, grazing, and recreational purposes. (Land owned by the State of Idaho is illustrated on the INEL neighbors overlay with a tightly crisscrossed black and white pattern.)

3.7.3 Private Lands

Private lands adjacent to the site are used primarily for agricultural purposes and grazing (DOE 1992d). Cultivated lands are almost exclusively concentrated along the northern portions of INEL. Uncultivated private lands are located to the southeast of the site. (Privately owned land under cultivation is illustrated on the INEL neighbors overlay with green vertical lines. Uncultivated private land is illustrated with green vertical lines interspersed with red dots.)

3.7.4 Grazing Buffer

A large portion of the outlying areas within the boundaries of the INEL site is devoted to grazing activities; this precludes the areas from any new development. DOE maintains MOUs with BLM that allow the bureau to issue and administer grazing permits to private interests (AEC 1950, 1958, 1972). (The INEL property under grazing permits is illustrated on the INEL neighbors overlay with diagonal black lines.)

3.8 Seismic Constraints

The Site Selection Report for the NPR (see Section 2.1.6) was utilized to examine potential seismic constraints on siting new facilities at the INEL. The site is primarily affected by the Lemhi fault, which runs through the Lemhi range adjacent to the northwest portion of the INEL. The NPR study concluded that the northwest portion of the site exhibited a moderate risk of earthquake activity capable of causing structural damage to facilities (Spry and Moor 1989). The seismic constraint map is included in Appendix B.

4. INEL FUTURE LAND USE ISSUES AND ASSUMPTIONS

Following examination of the environmental and development constraints, the long-term land use team identified key land use issues and assumptions. The identification of these issues and assumptions is particularly critical because of the long-term nature of the scenarios (100 years). The key issues identified include patterns in DOE policy that will be expected to continue. When information was more ambiguous, assumptions were made to limit consideration to a reasonable set of alternatives. In addition, the issues and assumptions provide benchmarks from which development patterns can be projected or extrapolated.

4.1 Issues

Identification of key land use-related issues is important because these factors represent a driving force behind much of the land use decision making that occurs at INEL. These issues currently are (and will continue to be) influential in guiding specific development projects as identified in the INEL Site Development Plan and affecting long-term land use trends and development patterns.

Future Facility Needs. The Land Use Steering Committee felt it necessary to identify and consider potential development criteria that new facilities to be constructed on the site might require. Facilities and development criteria considered include new or expanded research operations, expanded land area requirements, waste generation and disposal, waste site remediation, security requirements, D&D timetables, and discontinuation of specific processes or facility operations.

Obsolete Facilities. Advances in DOE research will require new state-of-the-art facilities to be constructed at INEL to replace existing, obsolete facilities. Such facility development will require significant new construction and possibly new facility areas. Appropriate location(s) will need to be identified and measures taken to ensure that selected areas are reserved for future development.

Contaminated Areas. The Land Use Steering Committee agreed that cleanup of contaminated areas will result in additional land being available for development. However, long-term radioactive contamination of some areas will preclude or hinder redevelopment. The extent of existing contamination will influence development potential in many areas of the site.

Institutional Controls. Future development plans must consider the need for *institutional controls*, which are specific measures intended to regulate future onsite land use (i.e., access restrictions such as fencing and other security measures, deed restrictions, zoning, land use review, and approval processes). Use of institutional controls may similarly be used to reserve appropriate areas for future development and ensure that contaminated areas are not developed.

Multiple Use of INEL Property. Members of the Land Use Steering Committee questioned whether use of INEL property for grazing, ecological research, agricultural research, wildlife management, mineral extraction, historic preservation uses, and other non-DOE purposes would still be appropriate and how such uses might be effectively restricted. The group also questioned the extent to which non-DOE uses should be encouraged, given future INEL operational requirements.

Future INEL Boundaries. Transfer of "surplus" property (to BLM) could result in the long-term loss of land resources. Such a loss of land might eventually hinder the DOE's ability to develop a new facility area or maintain a suitable buffer area.

Onsite versus Offsite Waste Disposal. Long-term disposal of wastes at INEL will require that appropriate areas be identified and that future land uses and facilities be sited so as not to impact, or be impacted by, waste disposal. Onsite treatment, storage, and disposal of wastes (hazardous, mixed, low-level, high-level, transuranic) will also influence land use decisions.

DOE Budget Constraints. The Land Use Steering Committee was concerned about how future DOE budget fluctuations will affect planned developments and research activities at INEL.

4.2 Assumptions

Because of the inherent uncertainty of developing long-term land use scenarios, assumptions must be made to provide a basis on which future development patterns can be formulated. Assumptions are thus used for defining intangible factors such as development pressure, advances in research, and ownership patterns. Over time, various assumptions may require changes based on unpredictable and unforeseen developments. As such, the following assumptions should be periodically reviewed to determine continued relevance and applicability:

- The INEL will remain under DOE management and control for at least the next 100 years.
- Advances in DOE and private-sector research will result in the obsolescence of existing facilities. It is further assumed that new facilities will need to be constructed in response to the need to provide state-of-the-art research facilities. Other programs, however, will be discontinued entirely after the facilities become obsolete.
- New construction may include structures in existing facility areas; other new construction may require the development of new facility areas.
- As facilities become obsolete, D&D will likely be required. Similarly, contaminated areas will require remediation.
- To the extent practical, new development will be encouraged in developed facility areas to take advantage of existing physical and service infrastructures. Such redevelopment will reduce environmental degradation associated with construction activities in previously undeveloped areas.
- The CFA will remain the focal area for support and infrastructure activities.
- The life expectancy of current and new facilities is expected to range between 30 and 50 years. The D&D process will commence following closure of a facility, assuming no new missions for a facility are articulated.

- Environmental restoration and waste management activities will continue. Cleanup of hazardous, mixed, and low-level waste sites is expected to be completed within 10 years following completion of a Record of Decision (ROD) for the CERCLA-mandated cleanup.

- Research and development facilities will be expanded to accommodate "new frontier research" such as fusion, transportation, space exploration, nuclear propulsion, alternative fuels, and advanced cleanup technologies.

- Research at the site will focus increasingly on advances in nuclear medical research and the production of isotopes used in medicine, research, and industry. In addition, other specific research initiatives (i.e., alternative fuels, advanced ER&WM technology, transportation, etc.) will gain importance at the site. To support such efforts, cooperative partnerships between the public and private sectors will be developed to achieve mutual goals. This could result in the reuse of INEL facilities by private-sector interests, supplemented with technology support by INEL personnel.

- INEL will continually be prepared to support defense-related operations (i.e., manufacturing, testing, support) in response to the ever-changing military climate throughout the world. Although INEL will continue to be used for defense-related research, other nuclear research will receive an increasing emphasis in years to come.

- Regional development trends will be closely related to activities at the INEL. For example, new housing development will be generated by increases in onsite employment because INEL is a major regional employer. Conversely, a major decrease in onsite employment will hamper the regional housing market.

- No residential development (i.e., housing) will occur within INEL boundaries; grazing will be allowed to continue in the buffer area, however.

- No new major, private developments (residential or nonresidential) are expected in areas adjacent to the site.

- An 890-mi^2 site dedicated to nuclear research, development, testing, and evaluation is irreplaceable. It was therefore assumed that it is extremely unlikely that a similar DOE facility could be sited at any other location.

5. LAND USE SCENARIOS

The first step in identifying INEL regions suitable for future development was to consider the interactions among the various environmental and development constraints in light of the key issues and assumptions. Based on the assumption that DOE would seek to locate new development in existing developed areas whenever possible to take advantage of physical and service infrastructures, the existing facility areas were considered first, and then areas outside the current facility areas were evaluated for new development potential.

Existing facility areas that lie within the floodplain were ruled out as likely sites for future development outside existing fence lines. Other constraints were considered as well but did not preclude reuse of presently disturbed areas.

Areas outside current major facility areas were evaluated based on the existence of certain opportunities for future development and fewer development constraints. Areas assumed to have good development potential exhibit the following characteristics:

- They are not located in a floodplain
- They exhibit relatively fewer ecologically sensitive areas
- They are in proximity to existing roads and electrical utilities
- They are not currently used for non-INEL uses (e.g., grazing)
- They are not located in proximity to public roads
- They do not have a high probability for cultural resource sensitivity
- They do not have a high seismic risk.

The initial analysis resulted in the identification of a portion of the INEL that will most likely support future development relative to other areas of the site. The identification of this area was based on multiple factors that could result in the avoidance of unnecessary environmental impact or high development costs.

Central Portion of INEL. This area, loosely bounded by Lincoln Boulevard to the west and utility lines to the south and east, will most likely be the focus of future development of INEL facilities. While not totally devoid of constraints, this area exhibits the best potential for supporting new development. The area is covered by a very thin surficial layer of loess and eolian sand over basalt. However, the severe irrigation limitations of these materials make this area an unlikely candidate for uses other than industrial. The area is outside of the Big Lost River floodplain and contains relatively fewer ecological constraints. The area is served by INEL infrastructure and also offers areas suitable for reuse. Because of its location in the center of the site within the INEL secured area, the potential for isolation of site activities is possible.

Conversely, this screening also identified areas of the INEL that most likely would be precluded from future development relative to other areas of the site, based upon specific environmental and operational constraints.

Big Lost River. Areas along the Big Lost River will most likely be precluded from future development for a variety of reasons. While these areas provide the best soils on the site, those soils

occur as a result of their location within the floodplain of the river. Modern development standards, including DOE policies for development, typically avoid such areas when siting new facilities. In addition, the area is characterized by the existence of a variety of ecological habitats, potential wetland habitats, and areas with a relatively high probability of cultural resources. Because several existing facilities are present in these areas (e.g., TRA, ICPP, NRF), reuse of currently disturbed areas without expansion is possible, but the siting of major new facilities along the Big Lost River is not expected.

Areas North of TAN. Land areas north of TAN also exhibit multiple constraints to developing future INEL facilities. The area lacks major structure elements, such as INEL-secured roads and rail access. In addition, the area is crossed by three major public highways, making interaction between INEL and public traffic more likely. The area also exhibits significant ecological value, providing critical wintering habitats for pronghorn as well as nesting and breeding areas for sage grouse. Further, the area exhibits seismic constraints.

Areas in the Vicinity of EBR-I. Lands immediately surrounding EBR-I (with the exception of the RWMC and BORAX) would most likely not be selected as a first choice for future INEL development. These lands are outside of the INEL secured area and are easily accessible from public highways. Also, the site's designation as a historic landmark would serve as a significant constraint to siting major new facilities in this area. Further, because the site is open to the public during part of the year, these lands would be impacted by shared access to the area.

INEL Grazing Buffer. The INEL grazing area would also most likely be disqualified when selecting potential new development sites. The buffer is used for grazing activities administered by BLM under various MOUs. Holders of the grazing permits are assumed to be economically dependent upon the availability of the land for grazing during portions of the year. The area is not served by major infrastructure facilities and also exhibits ecological and cultural resource value, such as nesting areas, caves, buttes, and craters.

Scenario Development. Through information presented on development constraints in Section 3 and the key issues and assumptions presented in Section 4, long-term future land use scenarios were projected. Each scenario of the site provides a "snapshot," in 25-year increments, of the projected development characteristics of INEL at various points in the future. They illustrate the progression of projected changes in the use of lands on site.

The colors used in each of the scenario maps indicate potential future uses of lands at the INEL. The potential future uses associated with each of these colors are as follows:

- Red areas (both solid and other shaded areas) indicate anticipated industrial land uses, consisting of worker-based uses and facilities, such as research/development facilities, support uses and waste management facilities. Such facilities could include development and/or reuse, for both DOE and non-DOE (i.e., private research/development facilities) in accordance with DOE's strategic goals to develop public/private initiatives for technology transfer.

- White areas indicate other areas of the INEL which could support future industrial land uses; however, these areas are anticipated to be considered secondary to areas depicted in red on the scenario maps, given constraint analyses included in Section 3.

- Yellow areas indicate the INEL grazing buffer, which would support grazing activities administered by the BLM as specified in the various MOUs discussed in Section 2. In addition, this area could support limited resource-based recreation uses, such as controlled hunting activities.

- Other colors (such as blue, purple, and black patterns) indicate either special areas (such as development buffers to public roads) and other features such as transportation corridors, roads, streams, and utility lines.

The scenarios presented are not meant to represent any site-specific future development proposals other than those currently specified in official DOE plans and policies. Further, the categories are not meant to represent a future land use plan for INEL but, rather, are intended to illustrate a reasonable scenario of the INEL based on currently adopted plans, missions, policies, and reasonably foreseeable future initiatives of DOE. Any specific plans for new facilities onsite would require necessary site selection, environmental review (including NEPA documentation), and public participation processes. For example, water rights and anticipated water needs for a proposed facility would be a project-specific issue, based upon the particular functions of a proposed facility, and would be reviewed in a project's site selection and environmental review processes. In addition, workforce projections are not included as it is impossible to predict the size and nature of facilities that will actually be developed in each of the scenarios.

Notwithstanding the anticipated land uses depicted in each of the future land use scenarios, future facility needs may require changes to the potential locations of industrial land uses. For example, the specific requirements of a future project could potentially be supported at sites within the grazing buffer, if it is determined that sites in these areas exhibit necessary land and locational characteristics. Should this occur, this document would be amended or supplemented with appropriate support documentation.

5.1 25-Year Scenario (A.D. 2019)

Under the initial scenario, the majority of activities occurring onsite will involve D&D of underutilized facilities and the development of support-related uses in various facility areas. While this scenario does not preclude the possible development of new production or research facilities, it does not require the creation of a new development area or facility area. New facilities would be incorporated into areas within current development areas. Major aspects of the 25-year scenario are presented below. The current facility areas are labeled in black. Changes to the facility areas between 1994 and 2019 are described below.

5.1.1 Site-Wide Activities (WAG 10)

With regard to activities projected site-wide, the 25-year scenario assumes continuation of current grazing boundaries at the INEL. It is anticipated that BLM will continue to administer grazing permits on the site, with general restrictions on the location and type of grazing activities permitted.

Additional activities within the boundaries of the grazing area are also possible in the 25-year scenario, such as the introduction of limited wildlife management techniques (e.g., controlled hunts) to address wildlife damage to crops immediately offsite. Further, the development of waterfowl

production ponds, generally located in spreading areas of the Birch Creek in the northern portion of the site, is currently in the early planning stages. Pending the resolution of appropriate water rights by INEL, the project could utilize offsite water used for existing hydroelectric production to foster a suitable environment for wildlife preservation and enhancement.

5.1.2 Test Area North (WAG 1)

No major new facilities are projected at TAN. Conversely, it is anticipated that the facility will begin the process of D&D of selected facilities within the facility area, which is indicated in red shading on the scenario map. Other than short-term support facilities for current operations in the TAN, new development of nuclear facilities are less likely. This projection is supported by reason of the site's location near public roads, away from INEL's centralized support facilities, and outside the INEL secured area. Further, as discussed under Section 3, areas north of TAN are located within a moderate risk area for seismic activity, which would discourage siting of any major new production or research facilities.

5.1.3 Test Reactor Area (WAG 2)

Activities at the current TRA point to a continuation of its operations through the 25-year scenario. Considering the significant number of projects and missions that currently exist at TRA, this facility area is expected to be used for industrial purposes. New facilities (indicated in red on the scenario map) planned for the TRA further support this projection, including the upgrading of utility distribution facilities and the construction of new training facilities, medical facilities, craft shops, and storage and staging areas (DOE 1993b).

5.1.4 Idaho Chemical Processing Plant (WAG 3)

Activities projected for the ICPP point to its continued industrial use through the 25-year scenario. These activities generally surround new waste-treatment facilities (indicated in red on the scenario map) currently being planned for the site. The ICPP is in the planning process to construct new facilities for treatment of radioactive calcine and graphite and special fuels. These facilities are expected to be online by 2015 (DOE 1993a).

5.1.5 Central Facilities Area (WAG 4)

A significant number of new projects (indicated in red on the scenario map) are planned for CFA that would support its continued industrial/mixed use at this 25-year scenario. Further, new support facilities located at CFA would influence the location of future facilities on the site (DOE 1993b).

5.1.6 Power Burst Facility and Auxiliary Reactor Area (WAG 5)

Within the 25-year scenario, both the PBF and the ARA are projected for D&D (areas indicated by red shading on the scenario map). Both facilities are in standby mode, with no current projects or missions planned. However, given these facilities' suitable location and relatively favorable site characteristics, the possibility for adaptive reuse is good. Therefore, the projected D&D process assumes industrial reuse within the facility area. The WERF given its expanded role in ER&WM

activities, is projected (as indicated in solid red on the map) to require a new facility in proximity to the current WERF within the planning period.

5.1.7 Experimental Breeder Reactor I/Boiling Water Reactor Experiment (WAG 6)

EBR-I is projected to remain in its current use as resource-base recreation (i.e., Historic Landmark). Borax is currently specified for D&D. Reuse for other uses would be restricted to industrial uses; however, this potential reuse is not likely in this scenario as compared to other areas of the INEL.

5.1.8 Radioactive Waste Management Complex (WAG 7)

With the planned construction of a waste characterization storage facility and Transuranic Storage Area (TSA) retrieval enclosure (DOE 1993b), the RWMC is expected to continue as an industrial land use facility throughout the 25-year scenario. Uncertainty in the opening of the WIPP increases the importance of the RWMC serving as at least a short-term waste management facility, if not a long-term storage facility.

5.1.9 Naval Reactors Facility (WAG 8)

Under the 25-year scenario, no change to or expansion of existing land uses is projected at the NRF. Land uses will continue to be industrial in nature and support the Navy's existing mission at the facility.

5.1.10 Argonne National Laboratory–West (WAG 9)

It is projected that ANL-W will continue operations throughout this time horizon as industrial use. Facilities located at ANL-W are considered some of the most advanced in their design. The facility is a major participant in the national Liquid-Metal Fast Breeder Reactor (LMFBR) Program, with unique facilities and equipment for conducting specialized experiments and research. Further, the facility is home to the EBR-II, which provides 40% of the INEL's power.

5.2 50-Year Scenario (A.D. 2044)

Under this scenario, it is projected that major existing facilities would begin to reach the end of their useful life, requiring a decision-making process on the possibility for full adaptive reuse of these facilities, limited or restricted use within the facility areas. It should be stressed that the D&D process and subsequent cleanup of other site contamination would require a longer time frame for completion. Therefore, the 50-year scenario identifies the beginning stages of this process.

Further, it is projected that new, emerging technologies will continue to require the establishment of facilities for both DOE and non-DOE (i.e., private initiatives) research and development of nuclear and nonnuclear energy applications, such as research in fusion, medical isotopes, nuclear space propulsion, and advanced ER&WM technologies. These are projected to be located in areas with optimal location factors and minimal site constraints. New infrastructure (i.e., roads, rail lines) may be required to support the location of these facilities. Major aspects of the 50-year scenario are presented

below. The current facility areas are labeled in black. Changes to the facility areas between 2019 and 2044 are described below.

5.2.1 Site-Wide Activities (WAG 10)

In the 50-year scenario, it is anticipated that a new corridor (indicated in red on the scenario map) will begin to develop running parallel to Lincoln Boulevard outside of the Big Lost River floodplain and avoiding ecologically sensitive areas discussed in Section 3. This area is currently served by utility infra- structure, and access points from Lincoln Boulevard would allow this area to be integrated into the INEL road network.

The projection of new research and development facilities may require construction of new roads or rail lines to service these areas. Therefore, it is anticipated that new development will tend to occur as an outgrowth of current facility areas such as the CFA, yet ensuring that there is adequate distance between the facilities to avoid impacts to current operations. Two new possible transportation corridors are depicted on the 50-year scenario; one running north from the CFA into the development corridor and one stretching east to ANL-W and Idaho Falls. The latter would possibly include some form of experimental mass transit system, as a result of implementing the INEL's strategic goal of developing advanced transportation systems research.

It is also projected that areas north of U.S. 20 (area indicated in solid blue) will not likely be used for any new development of major facility areas. Current DOE policies seek to limit the interaction between public roads and the site. Also, this area could serve as a future buffer to anticipated new development.

5.2.2 Test Area North (WAG 1)

In the 50-year scenario, it is projected that the useful life of TAN will be completed. Complete D&D of the facility (area indicated in a red pattern on the scenario map) will commence, with the goal of returning the facility to restricted industrial use for possible new nonnuclear research facilities (both DOE and/or non-DOE).

5.2.3 Test Reactor Area (WAG 2) and Idaho Chemical Processing Plant (WAG 3)

The TRA and ICPP will both begin to approach the end of their useful life under the 50-year scenario, assuming that no new specific mission is realized for either facility. At this point, the process for D&D will begin, with all or selected areas (indicated in a red pattern on the scenario map) of each facility being placed in "protective storage" mode with institutional controls to prevent access to the sites.

5.2.4 Central Facilities Area (WAG 4)

The technical and support service mission of the CFA will continue in the 50-year scenario. New transportation corridors will provide additional access avenues to other functional areas.

5.2.5 Power Burst Facility and Auxiliary Reactor Area (WAG 5)

It is projected that the lands associated (illustrated with red cross-hatching) with the former PBF will be utilized for new industrial facilities under the 50-year scenario. The facility area's location, in proximity to the CFA, buffered from public roads, and within an area with limited development constraints, makes it a candidate for reuse.

At the ARA, D&D activities begun under the 25-year scenario would be completed. The area would be within the no-new-development zone north of U.S. 20 (area indicated in solid blue) and south of the proposed transportation corridor. Reuse of existing ARA areas may continue; however, development of new facility areas are not anticipated.

5.2.6 Experimental Breeder Reactor I/Boiling Water Reactor Experiment (WAG 6)

The EBR-I would continue as a recreation use (i.e., historic landmark) in the 50-year scenario. BORAX would continue as a secondary area for restricted industrial use.

5.2.7 Radioactive Waste Management Complex (WAG 7)

A continuation of the original mission of waste management support for various high-tech radioactive waste processing, storage, and disposal activities is projected at the RWMC. The facilities constructed under the 25-year scenario would be approaching the halfway point of their useful life.

5.2.8 Naval Reactors Facility (WAG 8)

Under the 50-year scenario, no change to or expansion of existing land uses is projected at the NRF. Land uses will continue to be industrial in nature and support the Navy's existing mission at the facility.

5.2.9 Argonne National Laboratory–West (WAG 9)

The ANL-W is projected to begin the process of D&D (area indicated in red shading on the scenario map) under this 50-year scenario, assuming no new mission for the facility is realized. Because the facility is suitable for reuse and houses electrical production capabilities, it is anticipated that the facility will be decontaminated to allow for restricted industrial reuse of the facility.

5.3 75-Year Scenario (A.D. 2069)

Under the 75-year scenario, it is projected that the INEL will begin to develop a more consolidated, secured facility. DOE will continue to utilize adaptive reuse of facilities adequately located for new DOE and/or non-DOE industrial uses. New infrastructure improvements will create a new access network to take full advantage of prime development areas. The current facility areas are labeled in black. Changes to the facility area between 2044 and 2069 are described below.

5.3.1 Site-Wide Activities (WAG 10)

Under the 75-year scenario, the development corridor and reuse areas projected to develop at the 50-year horizon would be fully established industrial areas (indicated with solid red on the scenario map) at this point. New corridors of development (indicated with red cross hatching) would begin to grow from these areas as new research initiatives were demanded. Once again, these new development areas would need to avoid or mitigate impacts to sensitive biological areas.

Infrastructure changes would include a realignment of the INEL electrical loop configuration (indicated with black dashes) is anticipated to allow service to be provided in new development areas. This realignment could be located in conjunction with any required road or rail service needed.

New road improvements projected would allow the INEL to almost totally separate onsite movements of materials from interaction with public highways. The no-development zone north of U.S. 20 (indicated with blue zig-zags) would become a buffer between development and U.S. 20. Three gate areas would provide secured access to the consolidated development area (areas indicated with red triangles).

5.3.2 Test Area North (WAG 1)

It is projected that TAN will begin the process of redevelopment into an unsecured DOE or non-DOE industrial/research facility (indicated in a red stipple pattern), given its existing access to infrastructure and location near public highways. It anticipated that facilities that would be located here would be nonnuclear, given seismic constraints present in the area.

5.3.3 Test Reactor Area (WAG 2) and Idaho Chemical Processing Plant (WAG 3)

It is projected that the TRA and ICPP (areas indicated in red diagonal pattern) will remain in standby mode for restricted industrial use of their facilities. Their location within the secured area, although within lands with significant constraints, would allow for reuse of the facilities, although no new development would occur at these sites.

5.3.4 Central Facilities Area (WAG 4)

In the 75-year scenario, the CFA would maintain its status as INEL's primary technical service and support area. There may be a potential need for modification or new construction of support facilities to service changing needs at the site.

5.3.5 Power Burst Facility and Auxiliary Reactor Area (WAG 5)

The PBF would be within an established, secured development area under this scenario (indicated in solid red). Potential uses would include both nuclear or nonnuclear (DOE or non-DOE) industrial uses supported by an existing and improved infrastructure system.

Under this scenario, the ARA would be located in a buffer zone based upon an assumption that secured facilities would be limited from interaction between public roads. Development in existing ARA areas may continue, but development of facility areas outside of existing fencelines is not likely.

5.3.6 Experimental Breeder Reactor I/Boiling Water Reactor Experiment (WAG 6)

The EBR-I would continue as a recreation use (i.e., historic landmark) in the 75-year scenario. BORAX would continue as a secondary area for restricted industrial use.

5.3.7 Radioactive Waste Management Complex (WAG 7)

Under the 75-year scenario, the RWMC will approach capacity and the end of its useful life. Because of its location outside the secured area and in proximity to EBR-I, which is frequented by the public, the site most likely will begin the process of D&D to an unrestricted mode, if possible. However, long-term institutional controls will likely be required at the facility.

5.3.8 Naval Reactors Facility (WAG 8)

Under the 75-year scenario, existing facilities within the NRF would be placed in the "protective storage" mode of D&D (indicated by a red pattern). Given its current infrastructure of roads, rail line, and power, it would have industrial reuse potential, but its location within the Big Lost River floodplain would discourage any major future development outside its existing fenceline.

5.3.9 Argonne National Laboratory–West (WAG 9)

Under the 75-year scenario, the ANL-W, which was projected to be D&D (area indicated in red pattern) to be reused for industrial facilities, given its current infrastructure, energy production capabilities, and location within the secured area. The ANL-W would form the eastern limits of the development area.

5.4 100-Year Scenario (A.D. 2094)

The 100-year scenario projects a general continuation of the development and management characteristics of the INEL from the 75-year scenario. At this point, facilities created under the 50-year scenario will approach the end of their useful life, thus beginning a new cycle of development and reuse (areas indicated in purple on the scenario map). New technological advances in waste management will be continually used onsite to deal with possible environmental impacts. The current facility areas are labeled in black. Changes to the facility areas between 2069 and 2094 are described below.

5.4.1 Site-Wide Activities (WAG 10)

Under the 100-year scenario, no major changes in site-wide activities are anticipated from the 75-year scenario. The grazing area and transportation/utility corridors would be established and would continue in depicted locations.

5.4.2 Test Area North (WAG 1)

Under the 100-year scenario, TAN is anticipated to continue as an established industrial development area (indicated in solid red), consisting of DOE and non-DOE nonnuclear research uses.

5.4.3 Test Reactor Area (WAG 2) and Idaho Chemical Processing Plant (WAG 3)

The TRA and ICPP will continue as restricted industrial areas allowing the reuse of existing facilities, with no likely new development outside existing fencelines due to potential site constraints.

5.4.4 Central Facilities Area

In the 100-year scenario, the CFA would maintain its status as INEL's primary technical service and support area.

5.4.5 Power Burst Facility and Auxiliary Reactor Area (WAG 5)

Under the 100-year scenario, the PBF would continue as a established industrial development area, while the ARA would remain in a buffer area.

5.4.6 Experimental Breeder Reactor I/Boiling Water Reactor Experiment (WAG 6)

The EBR-I would continue as a recreation use (i.e., historic landmark) in the 100-year scenario. BORAX would continue as a secondary area for restricted industrial use.

5.4.7 Radioactive Waste Management Complex (WAG 7)

The RWMC (areas in red diagonal pattern) will remain as a restricted industrial use area, standby mode. Long-term institutional controls will be required at the facility.

5.4.8 Naval Reactors Facility (WAG 8)

The NRF would continue as a restricted industrial area allowing the reuse of existing areas, but no new development outside existing fencelines is anticipated due to potential site constraints.

5.4.9 Argonne National Laboratory–West (WAG 9)

Under the 100-year scenario, the ANL-W will be an established area (indicated in solid red) of new development because of its infrastructure and location within the central secured area.

5.5 Summary of Future Land Use Scenarios

Table 5-1 summarizes the anticipated future land use scenarios for each of the major facilities areas at the INEL. For each facility area, the table outlines its present use and presents the progression of projected future land uses through the 25-, 50-, 75-, and 100-year scenarios, as described in Sections 5.1 through 5.4.

Table 5-1. Summary of scenarios for each major facility area/waste area group.

Facility Area	Present	25-Year	50-Year	75-Year	100-Year
Test Area North (WAG 1)	Location of specific manufacturing capability program	Selection of facilities for D&D.	Continuation of D&D; selected restricted industrial reuse	Development of nonnuclear DOE or non-DOE industrial facilities	Established industrial development area
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
Test Reactor Area (WAG 2)	Studying effects of radiation on material, fuels, and equipment	Continuation of operations	End of useful life if no new mission; D&D for restricted industrial use	Standby made for restricted DOE or non-DOE industrial use; site constraints allow reuse, but no new development outside fenceline	Continuation of restricted industrial use
Land Use:	Industrial	Industrial	Industrial	Industrial	Industrial
Idaho Chemical Processing Plant (WAG 3)	Interim storage of spent nuclear fuels; disposition of fuels; managing waste and improving waste and improving water management techniques	Continue use as industrial area; planned new waste treatment facility on-line by 2015	Approaching end of useful life if no new mission; D&D with all or selected areas for restricted industrial use	Standby mode for restricted industrial use; reuse permitted, but no new development outside existing fenceline	Continues as a restricted industrial area
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
Central Facilities Area (WAG 4)	Technical and support service area for INEL	New projects to support continual industrial/ support activities	Continuation of support and service mission	Continuation of original mission; possible modification of new construction to support mission	Continuation of original mission
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
Power Burst Facility/Auxiliary Reactor Area (WAG 5)	PBF in standby mode pending D&D; Waste Experimental Operations Complex involved in low-level waste treatment	PBF: D&D reuse for industrial; favorable site conditions possibility for adaptive reuse	PBF: Used for new DOE or non-DOE industrial uses	Established industrial development area	Established industrial development area
	ARA: phased out in 1965; support buildings are now vacant except for intermittent small-scale testing	ARA: D&D; favorable site conditions possibility for adaptive reuse	Established no new development zone; use of existing developed areas	Designated buffer zone; use of existing developed area	Buffer zone; use of existing developed areas
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial

Table 5-1. (Continued).

Facility Area	Present	25-Year	50-Year	75-Year	100-Year
Experimental Breeder Reactor-I/ Boiling Water Reactor Experiment (WAG 6)	EBR-I: National historic landmark BORAX: D&D-restricted reuse	EBR-I: National Historic landmark BORAX: Restricted use	EBR-I: National historic landmark BORAX: Restricted use	EBR-I: National historic landmark BORAX: Restricted use	EBR-I: National historic landmark BORAX: Restricted use
Land use	Recreational/industrial	Recreational/industrial	Recreational/industrial	Recreational/industrial	Recreational/industrial
Radioactive Waste Management Complex (WAG 7)	Waste management support for various high-tech radioactive waste processing, storage, and disposal	Planned construction waste management facilities; continue as industrial facility	Continues as an industrial waste management area	End of useful life; D&D to protective storage	Restricted use area for DOE or non-DOE industrial activities
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
Naval Reactors Facility (WAG 8)	R&D facility that includes training facilities for naval personnel for operation of naval reactors	Continue operations of facilities	Continue operations of facilities	D&D; potential industrial reuse, but no new development	Continues as a restricted use area
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
Argonne National Laboratory–West (WAG 9)	Support by breeder reactor R&D; site of breeder reactor II producing 40% of INEL's power	Continue operations of facilities	Begin D&D process to dismantle for unrestricted use	Anticipated reuse as a DOE or non-DOE industrial use	Established area of new development
Land use:	Industrial	Industrial	Industrial	Industrial	Industrial
INEL Sitewide (WAG 10)	Grazing buffer; restricted nesting, research (NERP)	No new major facility areas; other uses continue; waterfowl production ponds	New industrial corridor; transportation access; other uses continue	New industrial areas in central portion of INEL; other uses continue	Selected D&D of facilities developed under 25-year scenarios; other uses continue
Land use:	Agriculture; recreation; industrial	Agriculture; recreation; industrial	Agriculture; recreation; industrial	Agriculture; recreation; industrial	Agriculture; recreation; industrial

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A

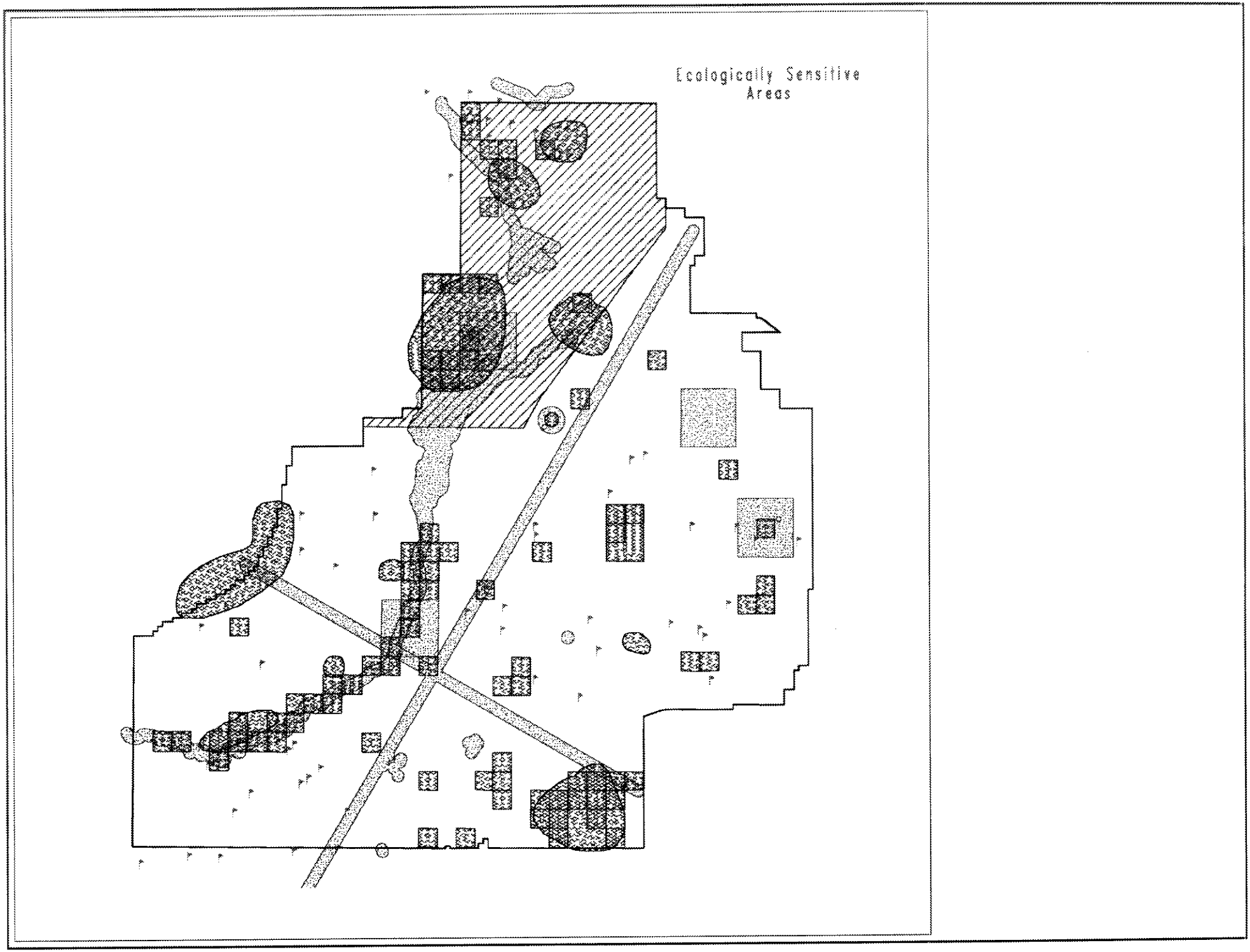
Appendix A

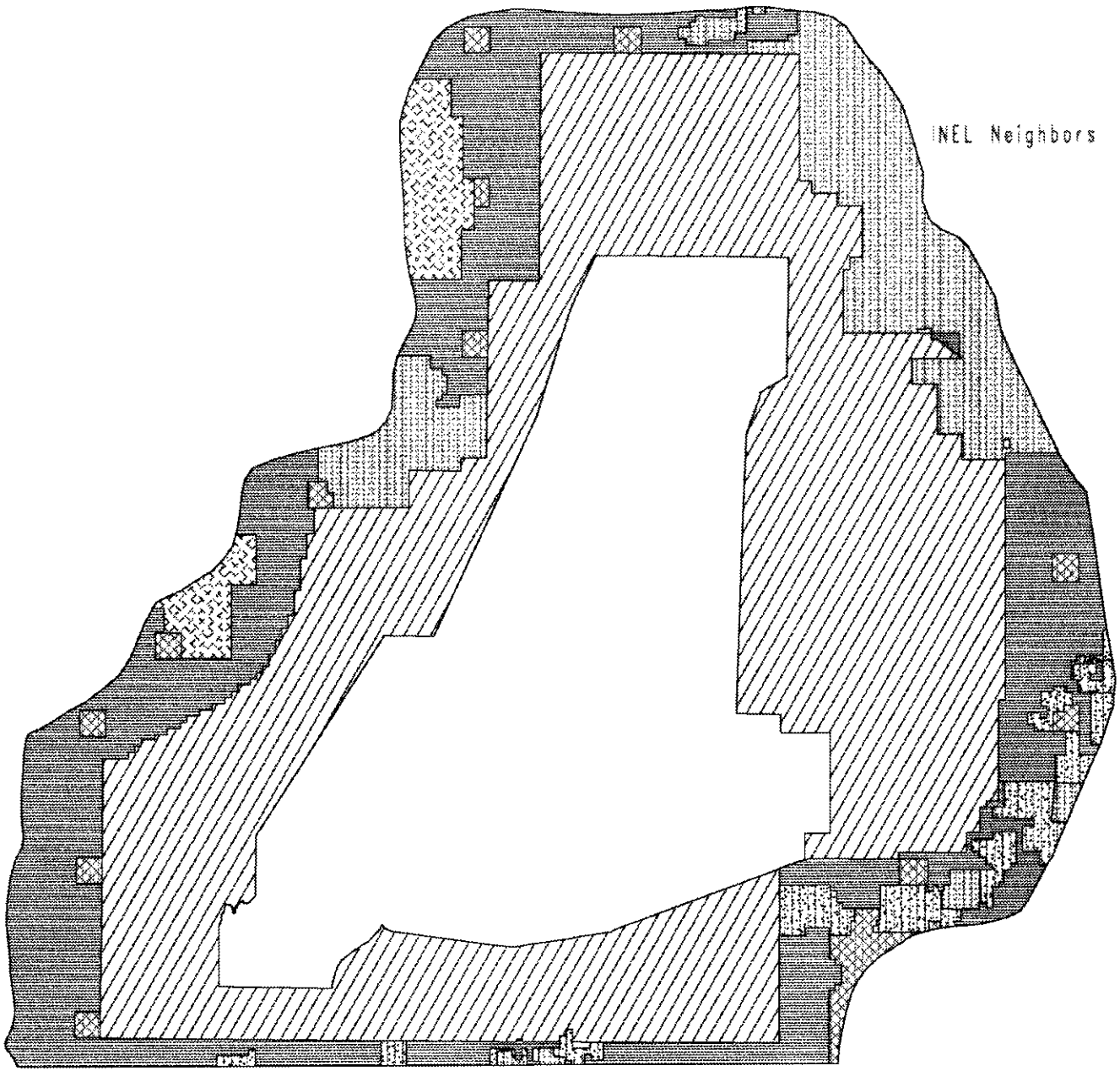
INEL Environmental and Development Constraints Overlay Map Series

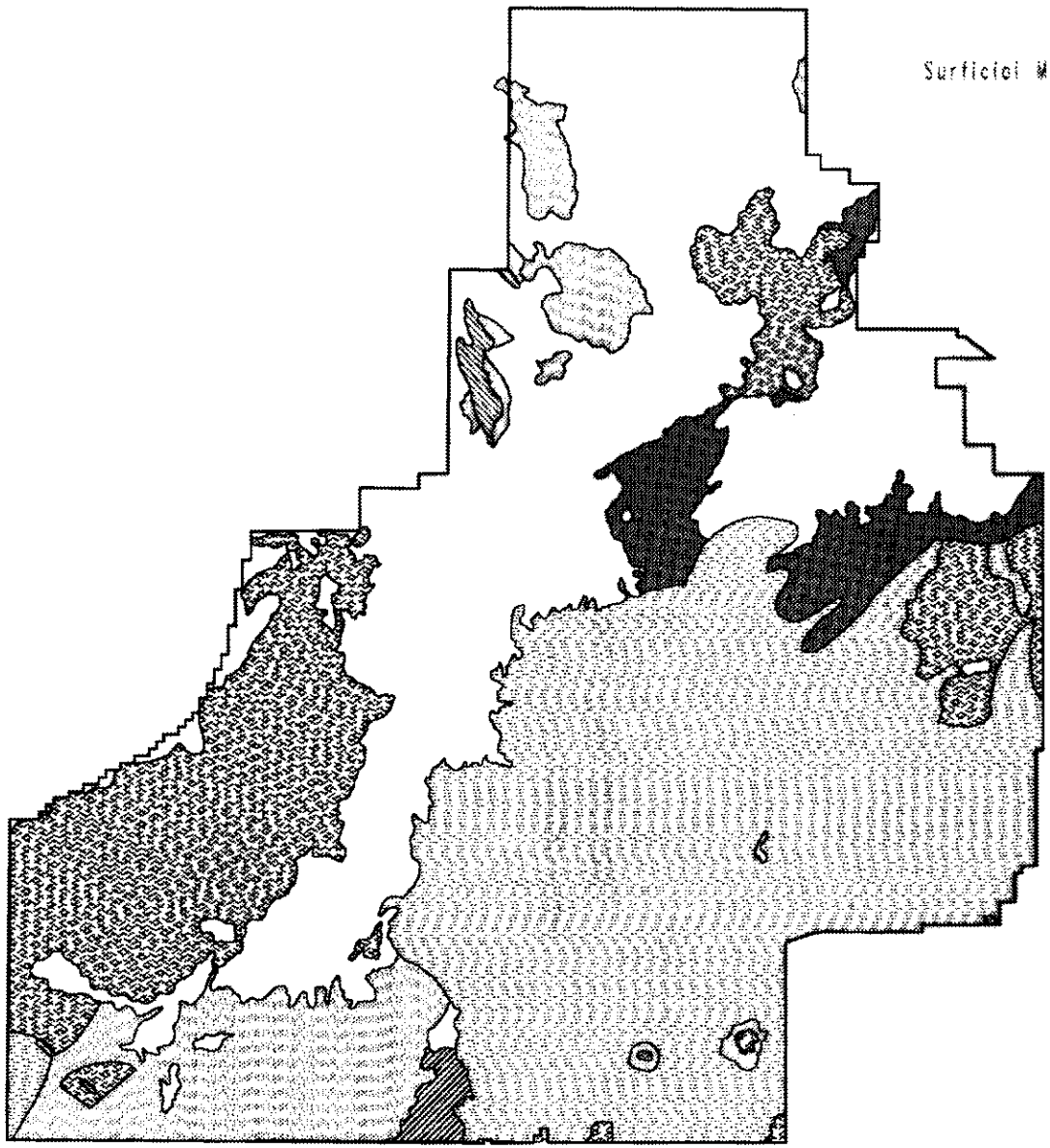
Includes:

Base Map
Hydrography Overlay
Surficial Materials Overlay
Contaminated Areas Overlay
Archaeological/Cultural Resources Overlay
Ecologically Sensitive Areas Overlay
INEL Neighbors Overlay

Please Note: Maps can be removed from the plastic protective cover through the top opening. The reader may wish to examine them separately or in different combinations. The reader may also wish to examine one or more of the overlay maps on top of the future scenarios maps, which are included in the second packet.


Ecologically Sensitive
Areas


INEL Neighbors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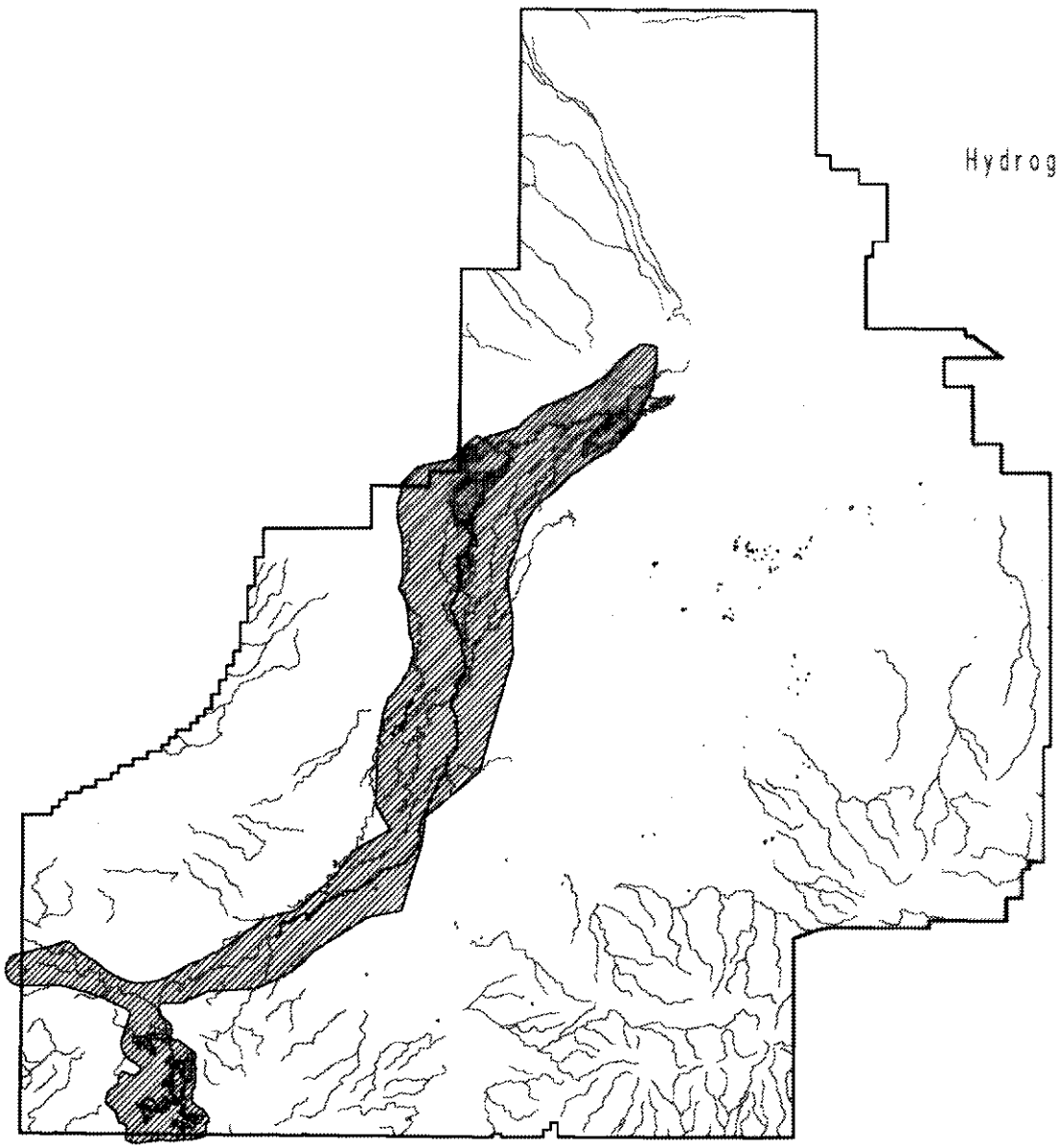
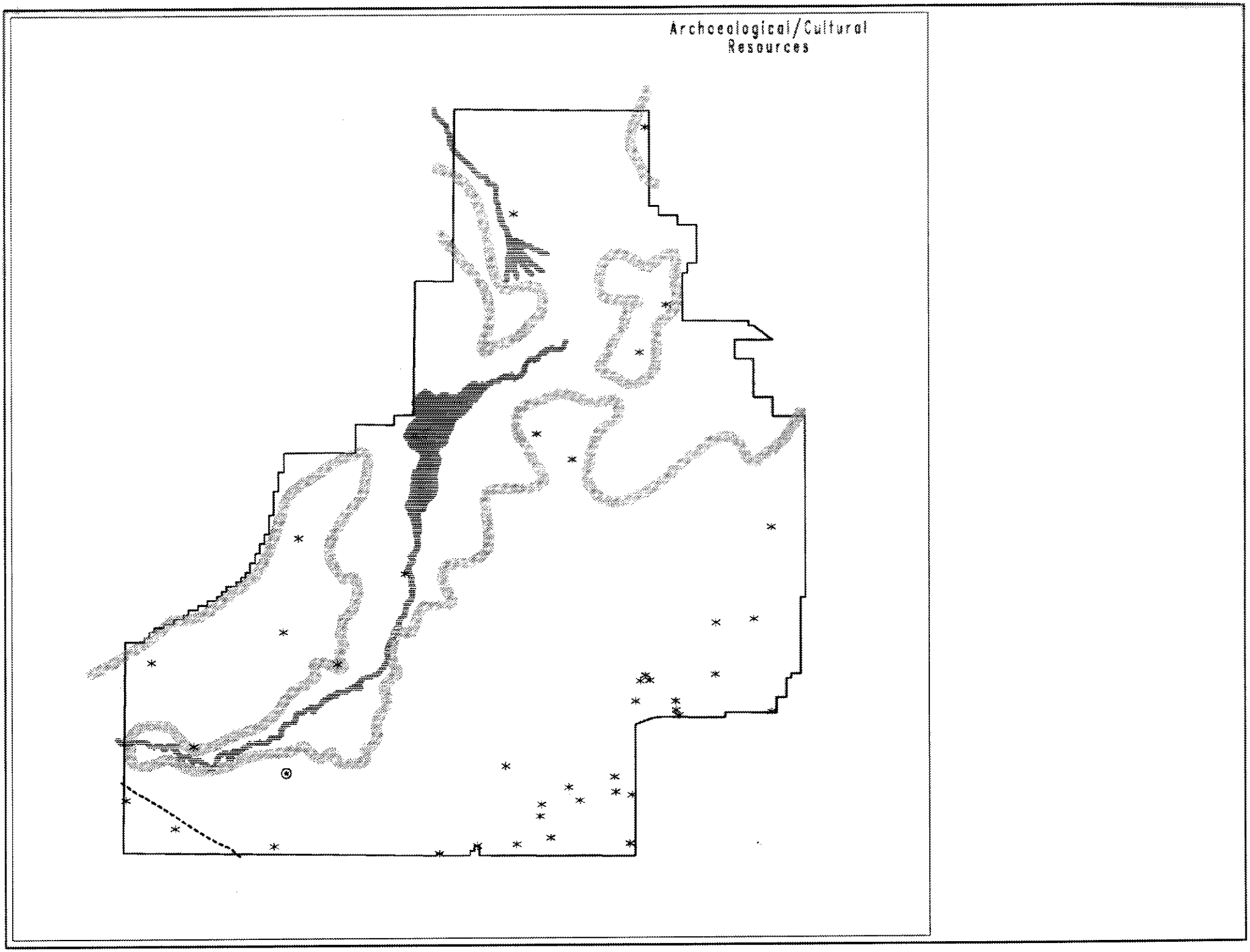
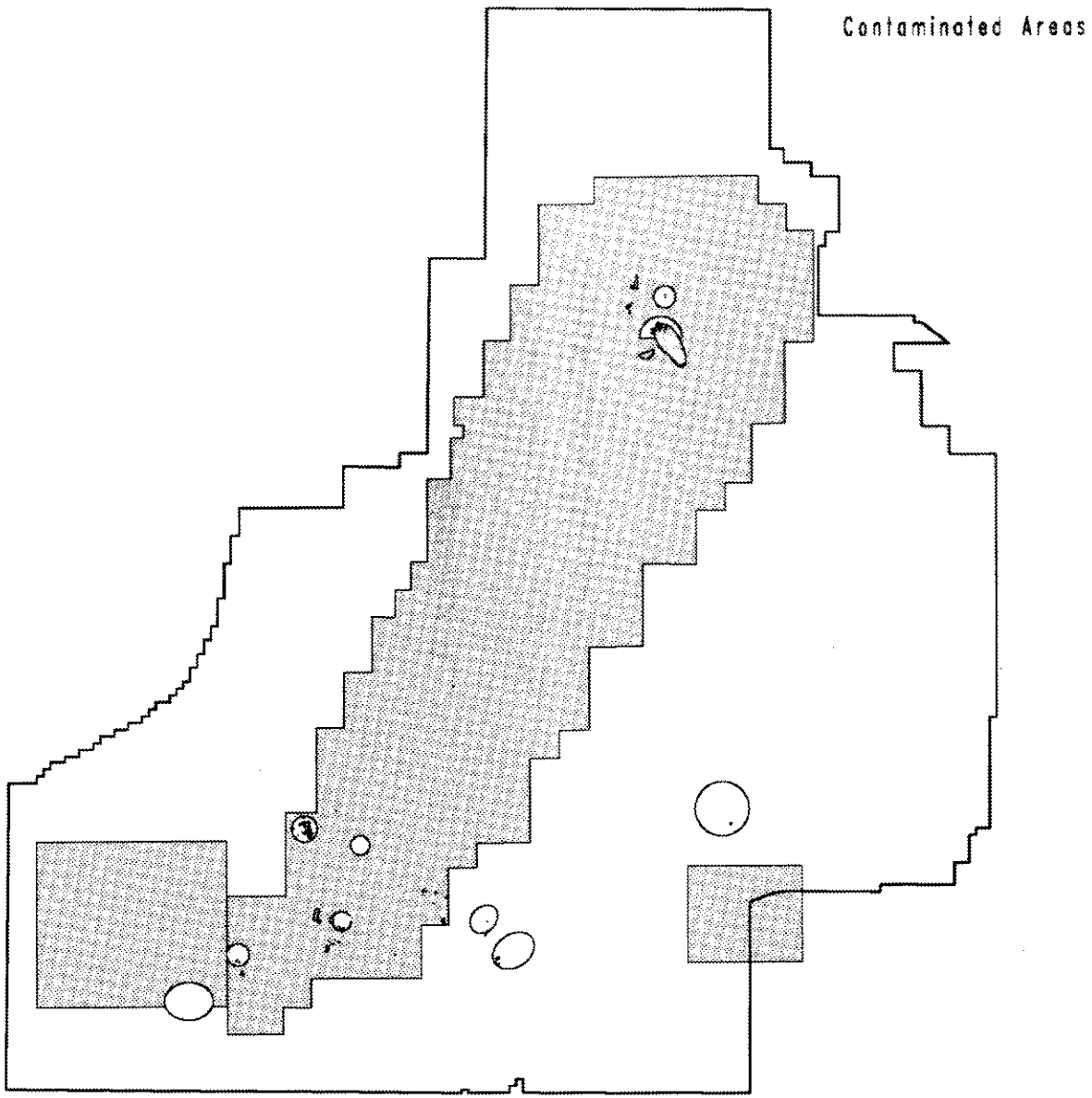
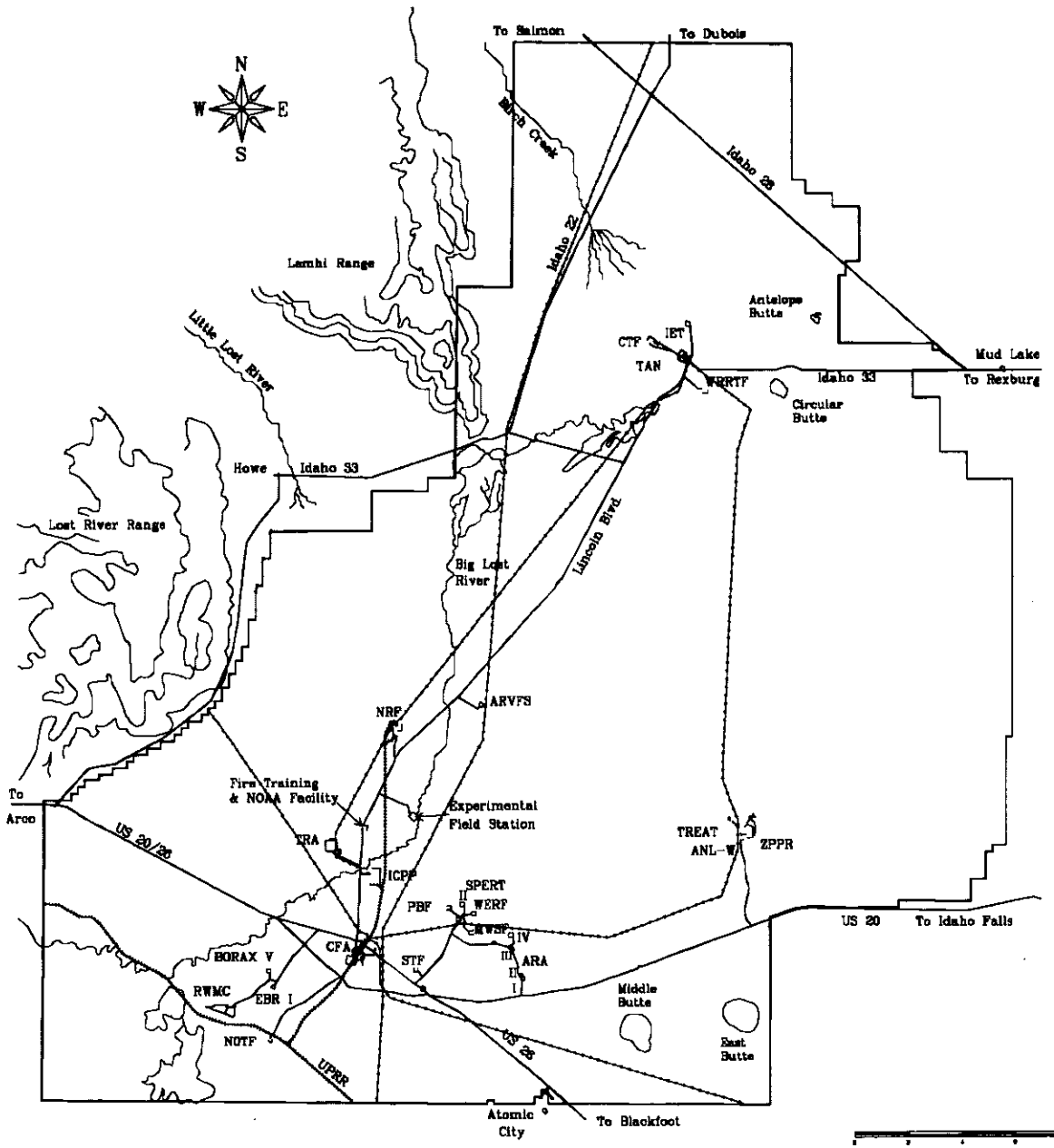

Hydrography


Archaeological/Cultural
Resources


Contaminated Areas

INEL Environmental & Development Constraints



LEGEND

- Public Roads
- INEL Roads
- Streams
- Railroads
- Utility Lines

Hydrography

- Floodplain
- Streams
- NWI-Mapped Wetlands

Surficial Materials

- Fan Deposits
- Thin Sand Sheets (3-15 Feet)
- Loess Unit 1 (0-3 Feet)
- Loess Unit 2 (0-10 Feet)
- Loess Unit 3 (0-15 Feet)
- Colluvium Derived from Silicic Volcanic and Intrusive Rocks
- Basalt (Less Than 1 Foot)
- Rhyolite Flows, Breccia and Obsidian (3-30 Feet)

Contaminated Areas

- Environmentally Controlled Area
- Surface Contamination (Estimated Area)
- Ordnance Impact Area

Archaeological/Cultural Resources

- 500 meter wide zone on either side of Big Lost River, Birch Creek and around Sinks
- 1 kilometer wide lava edge zone (flow locations are approximate)
- Goodales' Cutoff Historic Trail (approximate route)
- Buttes, Craters, Coves
- National Historic Landmark

Ecologically Sensitive Areas

- Sensitive Biological Resource Areas
- Pronghorn Wintering Area
- Buffer for Protected Areas
- Sagegrouse Leks

INEL Neighbors

- Bureau of Land Management/Grazing
- National Forest Land
- Private Land - Non-Cultivated
- Private Land - Cultivated
- State Land
- Under Grazing Permits

Data Drawn: August 15, 1994

(/u1/gis/data/special_e_atcse)

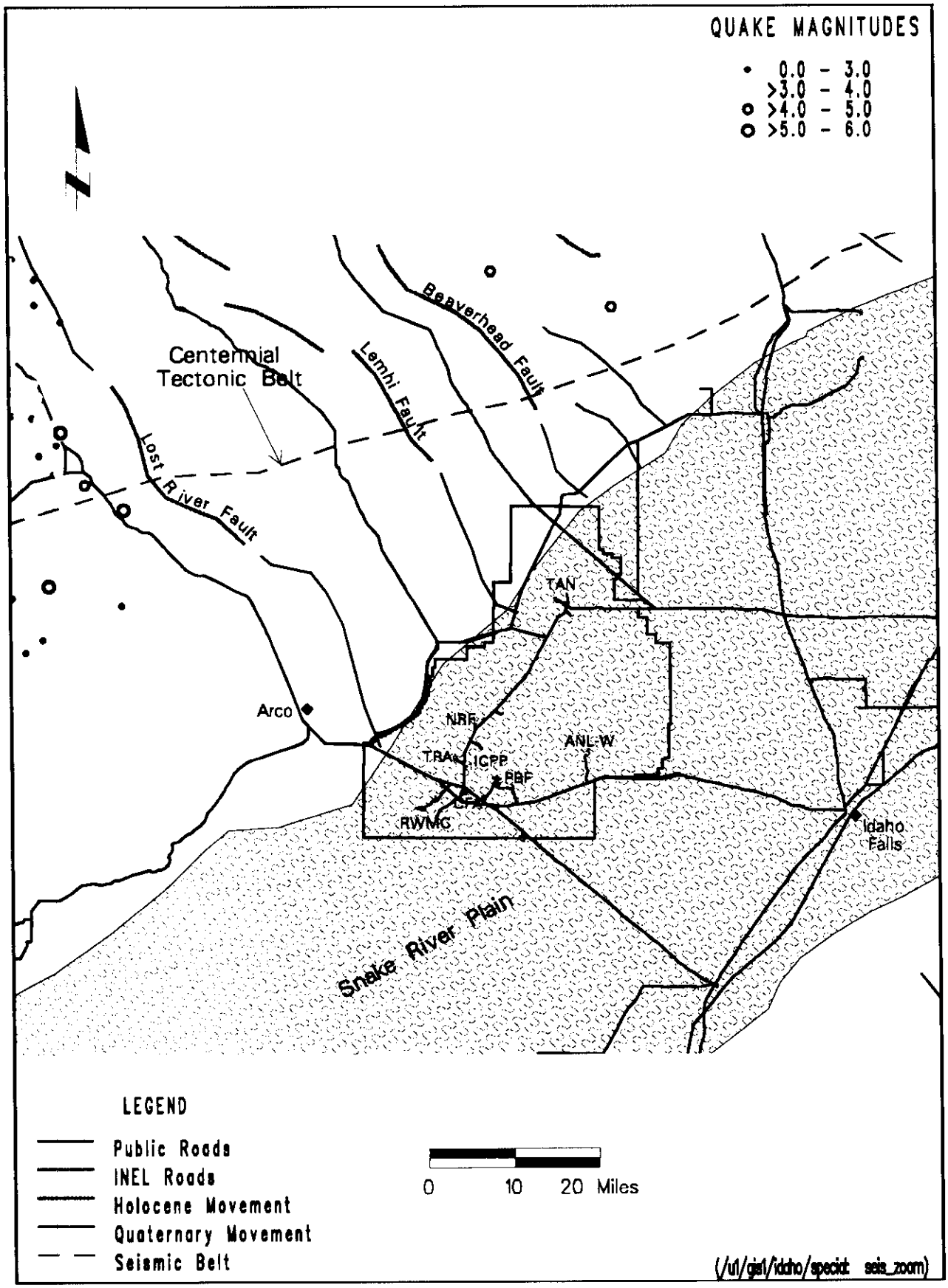
INEL SPATIAL ANALYSIS LABORATORY

APPLYING TECHNOLOGY TO MEET ENVIRONMENTAL NEEDS

B

Appendix B

Seismic Characteristics Map



Appendix B SEISMIC CHARACTERISTICS AROUND THE INEL

C

Appendix C

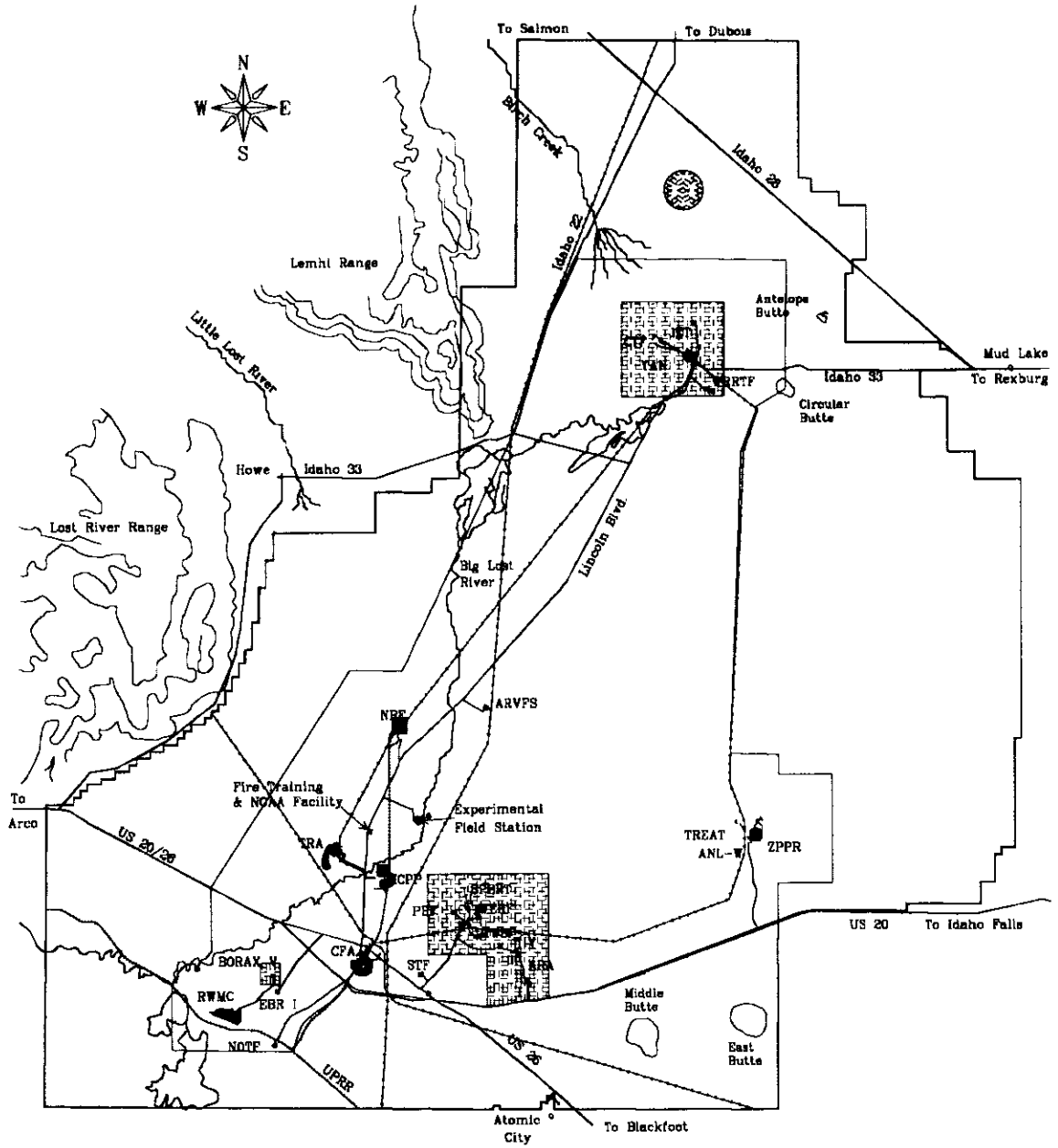
INEL Long-Term Land Use Future Scenarios Maps

Includes:

25-year Scenario
50-year Scenario
75-year Scenario
100-year Scenario

Please Note: Maps can be removed from the plastic protective cover through the top opening.

INEL 25-YEAR LAND USE SCENARIO (2019 A.D.)



LEGEND

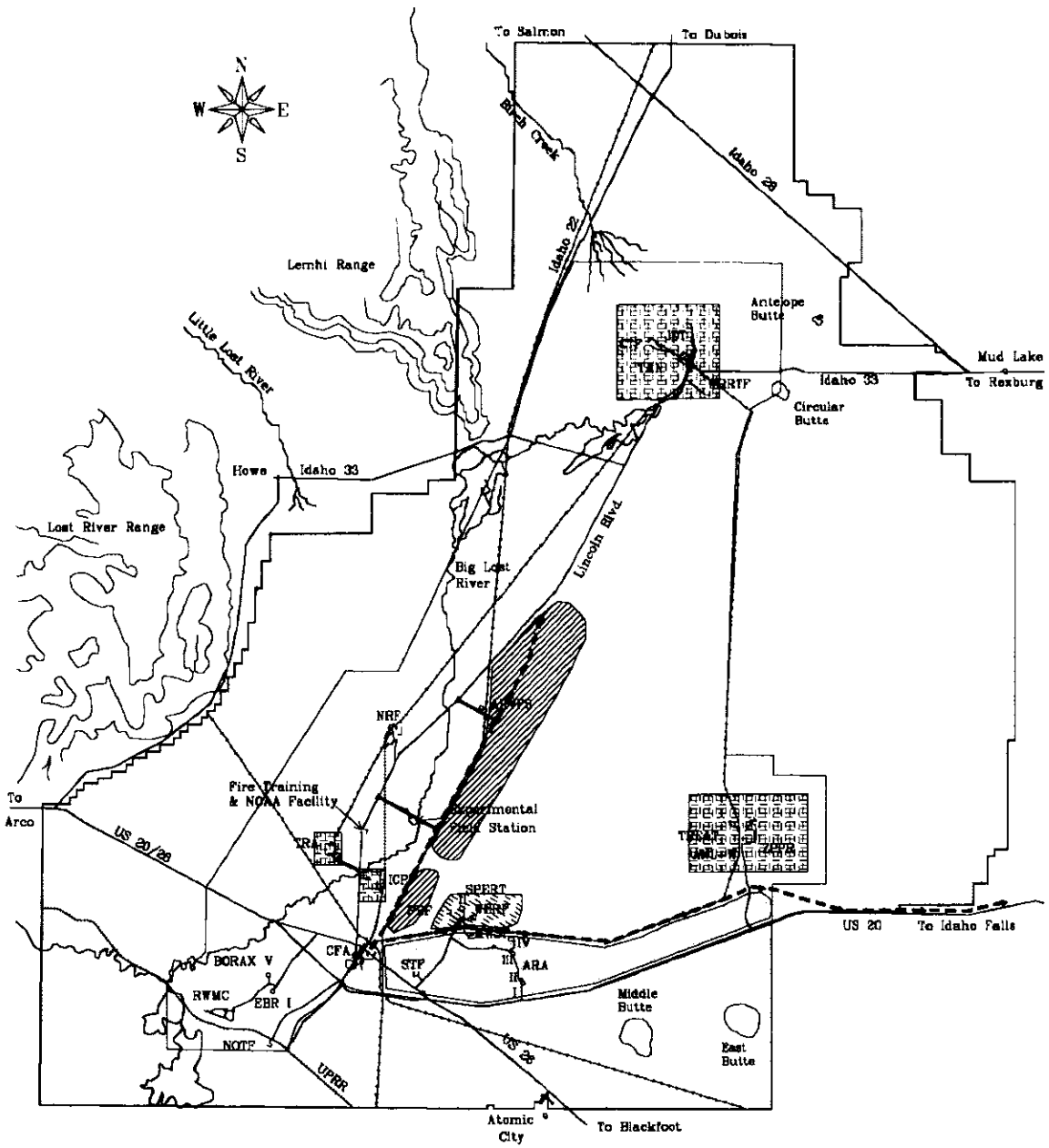
- Public Roads
- INEL Roads
- Streams
- Railroads
- Utility Lines
- Grazing Area
- Decontamination & Decommissioning (Protective Storage or Entombment)
- Proposed Water Fowl Production Ponds
- Current Facility Areas
- New Construction (as outlined in 20-year planning documents):
  - CFA: DOE and EG&G Modular Offices, Storage, Emergency Response, Medical, and New RESL Facilities, Warehouse, Environmental Lab and Transportation Complexes; Construct Solid Waste Transfer Station
  - ICPP: Construct New Improvements: Radioactive Calcine, Graphite and Special Fuels Facilities
  - TRA: New Training and Medical Facilities, Utility Upgrades, Staging, Storage, and Craft Shops
  - RWMC: Construct Waste Characterization & Storage and TSA Retrieval Enclosure Facilities
  - WERF: Construct New "WERF" Near Existing Site
- Other Areas Suitable for Development; However, Secondary to Existing Developed Areas

Date Drawn: July 26, 1994

INEL SPATIAL ANALYSIS LABORATORY
APPLYING TECHNOLOGY TO MEET ENVIRONMENTAL NEEDS

{/ul/gisl/idaho/special: inel-25yr}

INEL 50-YEAR LAND USE SCENARIO (2044 A.D.)



LEGEND

- Public Roads
- INEL Roads
- Streams
- Railroads
- Utility Lines
- Grazing Area
- No New Development Zone
- Decontamination & Decommissioning (Protective Storage or Entombment)
- New Development Corridor (Industrial - DOE or non-DOE) Based Upon Optimum Site Characteristics
- Adaptive Reuse of Former Facility Areas
- Other Areas Suitable for Development; However, Secondary to Existing Developed Areas and Projected Development Areas

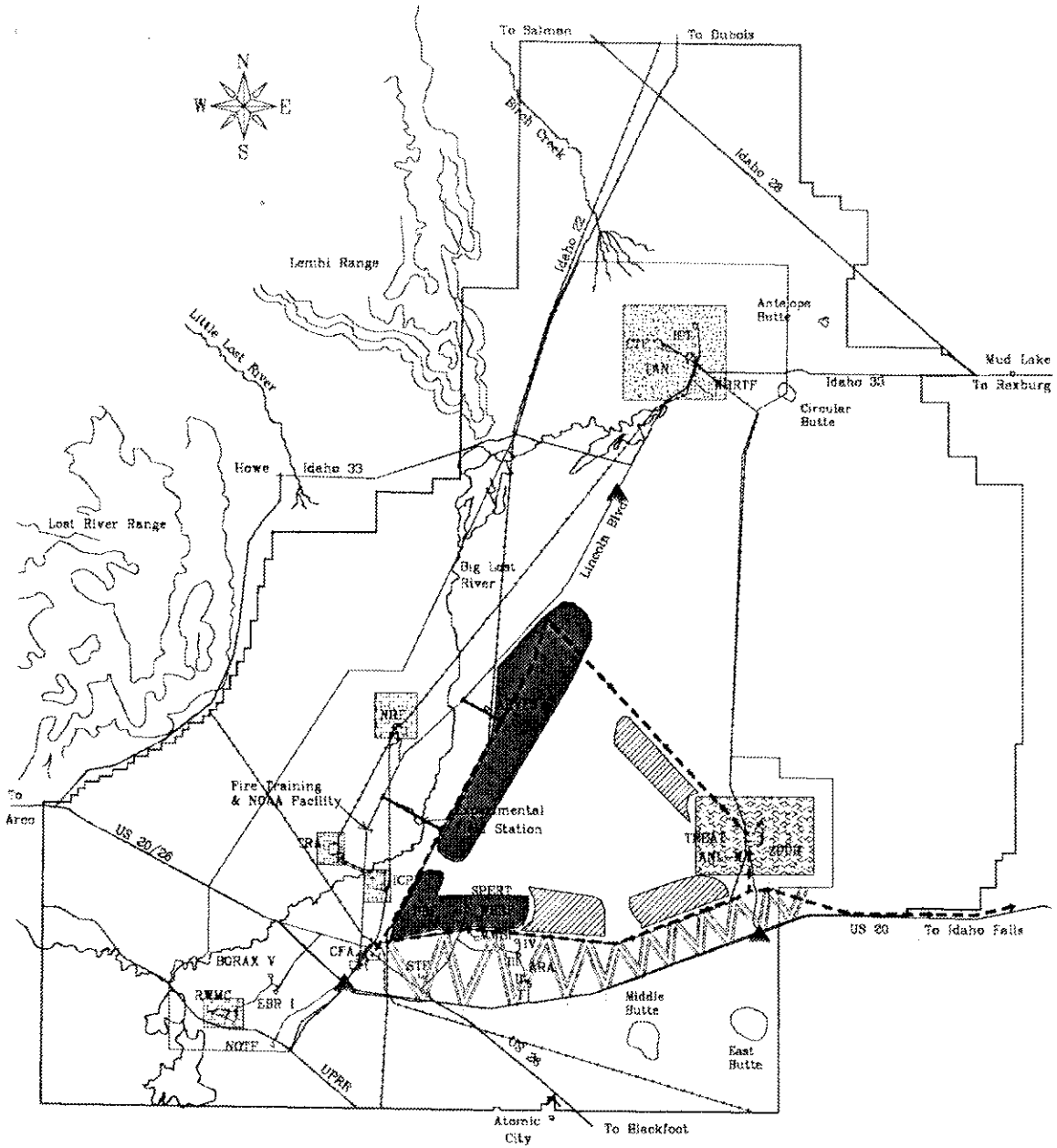
- Possible Transportation Corridors:
  - Roads
  - Freight Rail
  - Mass Transit
- Possible Access Points

Date Drawn: August 01, 1994

INEL SPATIAL ANALYSIS LABORATORY

(/ul/gisl/idaho/special: inel-50yr)

INEL 75-YEAR LAND USE SCENARIO (2069 A.D.)



LEGEND

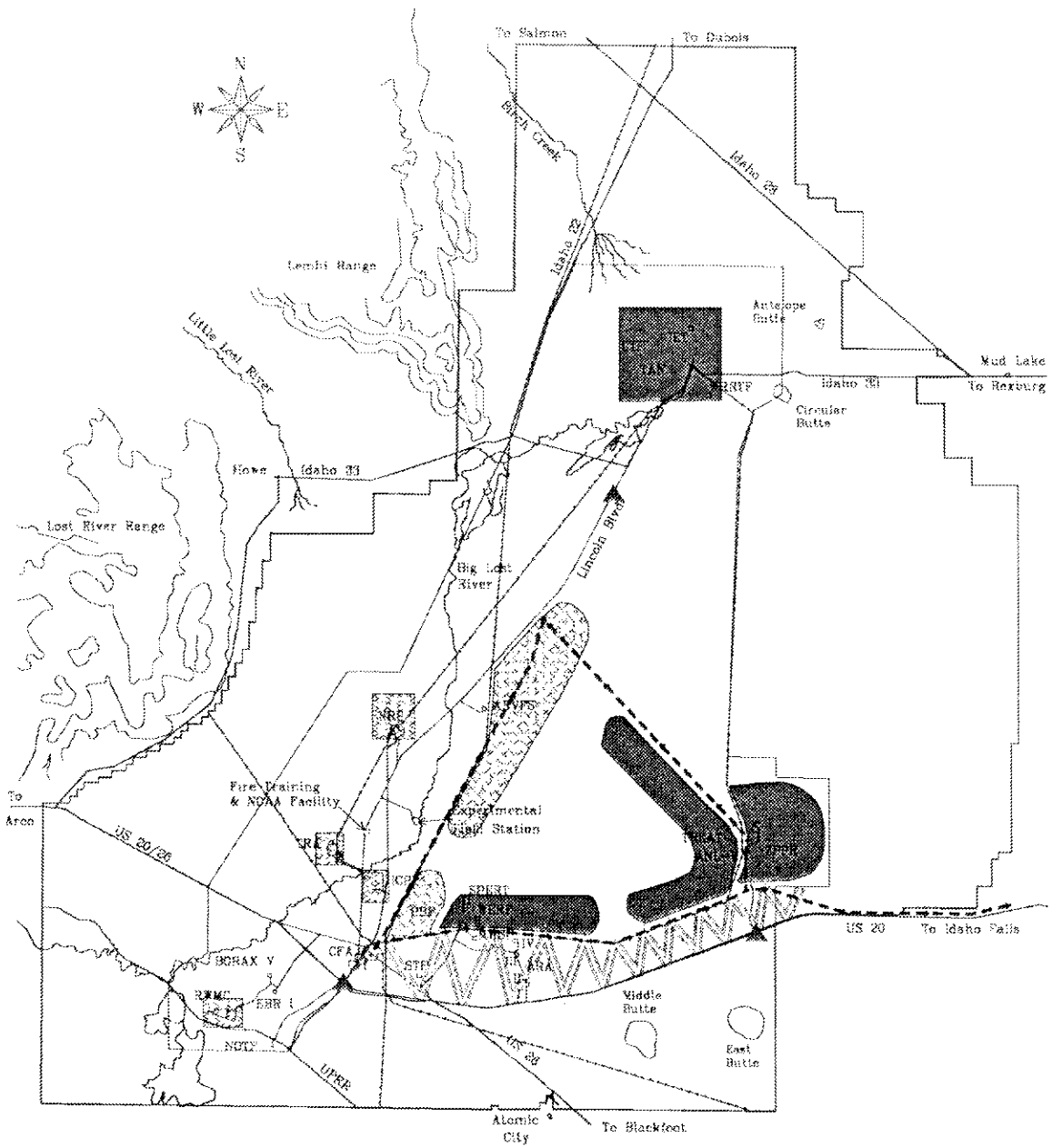
- Public Roads
- INEL Roads
- Streams
- Railroads
- Utility Lines
- Grazing Area
- Development of Nonnuclear Industrial Facilities (DOE or non-DOE)
- Decontamination & Decommissioning (Protective Storage or Entombment)
- Projected New Development Area Based Upon Optimum Site Characteristics
- Established Industrial Development Area
- Formerly D&D Facility – Restricted Industrial Use
- Other Areas Suitable for Development; However, Secondary to Existing Developed Areas and Projected Development Areas
- Possible Transportation Corridors:
  - Roads
  - Freight Rail
  - Mass Transit
- Possible Access Points
- Buffer to Public Roads
- Secured Access Points

Date Drawn: August 01, 1994

EG&G INEL SPATIAL ANALYSIS LABORATORY

(/a1/gis1/idaho/special: inel-75yr)

INEL 100-YEAR LAND USE SCENARIO (2094 A.D.)



LEGEND

- Public Roads
- INEL Roads
- Streams
- Railroads
- Utility Lines
- Grazing Area
- Established Industrial Development Areas
- Formerly D&D Facility - Restricted Industrial Use
- Areas Approaching First Cycle of Use - Selected D&D
- Other Areas Suitable for Development; However, Secondary to Existing Developed Areas and Projected Development Areas
- Possible Transportation Corridors:
  - Roads
  - Freight Rail
  - Mass Transit
- Buffer to Public Roads
- Secured Access Points

Date Drawn: August 01, 1994

EG&G INEL SPATIAL ANALYSIS LABORATORY

(/ul/gis/idaho/special: inel-100yr)

D

Appendix D

Participation Forum Group Memory

INEL LONG-TERM LAND USE PARTICIPATION FORUM
December 1, 1992, 8:30 a.m. to Noon
IETC Building, Room 113

GROUP MEMORY

INTENDED OUTCOMES. Meeting 1 of the INEL Long-Term Land Use Participation Forum was designed to meet the following objectives:

- To provide the Department of Energy with an opportunity to inform regional planning professionals about the purpose and need for a long-term land use planning document for INEL and the approach being used by the Department to develop the document.
- To gather early input from the same regional planning professionals on key issues including: planning assumptions, relevant reference documents, areas of concern, and goals to be incorporated into the document.
- To plan the "Next Steps" for developing a document.

AGENDA. The following agenda (designed to achieve the intended outcomes) was agreed to by those in attendance:

WHAT	HOW	TIME
Introduction to the Participation Forum	All Participation Forum participants will introduce themselves	8:30 - 9:00
	Alice Williams will welcome Participation Forum participants on behalf of the Department of Energy	
	Wendy Green will present the intended outcomes and agenda for Meeting One	
	All will discuss and establish ground rules to be used during Participation Forum meetings	
DOE Long-Term Land Use Planning	Bob Brown and John Robinson will present the purpose and need for a long-term land use document at the Idaho National Engineering Laboratory	9:00 - 9:25
	Dan Castle will present the approach being used by the planning team in developing the planning document	
Key Assumptions	All Participation Forum participants will volunteer key planning assumptions incorporated in their respective jurisdictions' planning efforts that may be of interest to the planning team in developing the planning document	9:25 - 9:45

WHAT	HOW	TIME
BREAK		9:45 - 10:00
Key Documents to be Consulted	All Participation Forum participants will review the draft list of non-DOE references being consulted and make additions to that list to help ensure that the planning team will consult all appropriate references in developing the planning document	10:00 - 10:15
Key Issues of Concern	All Participation Forum participants will brainstorm key issues (areas of concern from their own unique perspectives) that they hope the DOE will consider in developing the planning document	10:15 - 11:00
Key Goal Areas	All Participation Forum participants will discuss key goals that they would like to see incorporated into the planning document	11:00 - 11:40
Wrap-Up	All Participation Forum participants will raise any additional issues they would like to bring up	11:40 - 12:00
	Bob Brown and John Robinson will present plans for later involvement of the Participation Forum in the planning process and all will discuss additional "Next Steps"	
	All Participation Forum participants will evaluate Meeting One of the Participation Forum	

Wendy Green agreed to help the group stay on schedule and finish all of the objectives by noon.

GROUND RULES. The following ground rules were suggested and adopted by the Participation Forum attendees:

- No hitting below the belt.
- Everyones' input is valuable.
- Silence is consent.
- All responsible for correcting recorder.

Wendy Green agreed to take responsibility for enforcing the ground rules as needed, and asked for help from attendees if they feel the need.

PURPOSE AND NEED FOR DOCUMENT. Bob Brown explained that the Department of Energy believes a long-term land use planning document is needed for INEL because:

- There is a need to define relationships among INEL and its neighbors.
- Good management requires careful planning.
- With decreasing budgets, planning allows for efficiency and priority setting, which saves money.
- Planning allows for comprehensive, integrated approaches to future development of the site.

PLANNING APPROACH. Dan Castle explained that the following steps would be taken by the planning team in developing a long-term land use planning document for INEL:

1. Identify key issues and assumptions.
2. Develop goals and objectives.
3. Describe existing land uses.
4. Project future land use scenarios, using 20 year increments.
5. Develop the land use plan.
6. Develop implementation strategies.

ASSUMPTIONS. Participation Forum attendees were asked to state assumptions that are being made during planning efforts in each of their respective organizations and jurisdictions that the Department might need to be aware of in developing its long-term land use planning document. The following list of assumptions was produced by those in attendance at the meeting.

- The conflicts between use and preservation are accentuated by increased tourism and other uses.
- Custer County is making an effort to diversify its economic base away from its current degree of dependence on mining.
- A Bonneville County citizens' group is promoting expansion of the county's economy.
- The quality and quantity of wildlife habitat will continue to decline, both statewide and on or near INEL.
- Natural and cultural resources will be increasingly imperilled.
- The demand for wildlife-related recreation will continue to increase at an accelerating rate.
- Traffic on the roads crossing the INEL site will increase (including both site-related and nonsite-related traffic). As a result,
  - Traffic increases may result in an increased need for maintenance and reconstruction of existing highways and materials (gravel pits) located on site,
  - Siting of gravel pits may impact on the public's perception of visual resources.
  - There will be an increased need for coordination with site personnel for routine maintenance work.
- Visitation at Craters of the Moon has increased by approximately 20% per year for the last two years and is expected to continue to increase.
- Visitors are changing. For example, they are getting older and requiring different kinds of facilities.

- There is an increasing demand for wilderness recreation.
- There will be more intensive use of land surrounding the site (including increases in agricultural uses in all adjacent counties and increases in residential uses in both Bonneville and Bingham counties).
- Jefferson County residential growth is occurring primarily along the Lewisville highway.
- There is a proportionally greater demand for nonconsumptive uses of federal land as compared to consumptive uses (including mining and grazing).
- The economic base of Bonneville County will be increasingly non-agricultural (except industrial).
- Jefferson County is becoming more residential.
- Butte County will remain primarily agricultural, although the citizens hope to diversify.
- There will be an increased demand for use of government lands by tribal people for hunting, fishing, and gathering.
- The site will remain as it is now (undeveloped); traffic will increase but other onsite uses will not.
- There will be an increasing demand for offsite support services.
- There will be increases in demand on forests.
  - Use patterns by local populations will remain fairly constant,
  - The amount of visitors is increasing,
  - Nonlocals display less "ownership" of the public lands.
- At Craters of the Moon, all usage is increasing, and most visitors display more ownership.
  - Locals display a sense of economic ownership, as they benefit from the monument's visitors.
- The State of Idaho is actively promoting tourism and increases in tourism can be expected.
- Out-of-area users of land have different expectations than local users (traffic, hunting).

KEY DOCUMENTS. INEL Long-Term Land Use Participation Forum attendees were given the following list of documents being referenced by the planning team.

Bingham County. 1986 Bingham County Zoning Ordinance. Bingham County Planning Commission. Bingham County, Idaho.

Bonneville County. 1991. Bonneville County Comprehensive Plan. Bonneville County Planning Commission. Bonneville County, Idaho (portions prepared between 1988 and 1991).

Butte County. Butte County Comprehensive Plan. Butte County, Idaho.

City of Idaho Falls. 1989. Zoning Ordinance of the City of Idaho Falls. Idaho Falls, Idaho.

Clark County. 1986. Clark County Planning and Zoning Ordinance. Clark County Commissioners. Clark County, Idaho.

Clark County Soil and Water Conservation District. 1991. Five-Year Resource Conservation Plan 1991-1995, Clark County, Idaho.

Code of Federal Regulations. 1992. Nuclear Regulatory Commission. 40 CFR 61.

EG&G Idaho, Inc. 1992. Land use and related resources maps from GIS Data Base. Idaho Falls.

EG&G Idaho, Inc. 1991. Idaho National Engineering Laboratory Environmental Resources.

Idaho Department of Lands. 1979. Land Use Plan for Twin Buttes Planning Unit, Idaho.

Jefferson County. 1988. Jefferson County, Idaho Comprehensive Plan. Jefferson County, Idaho.

Jefferson County Soil and Water Conservation District, 1990. Five-Year Resource Conservation Plan 1990-1994. Jefferson County, Idaho.

United States Code. 1976. Federal Land Policy and Management Act of 1976, 43 USC 1701.

U.S. Department of Agriculture, Soil Conservation Service. 1981. Soil Survey of Bonneville County Area, Idaho.

U.S. Department of the Interior (DOI). 1983. Big Lost Mackay Area Range Management Plan EIS. Idaho Falls and Salmon Districts, Idaho. Bureau of Land Management. Idaho Falls, Idaho.

DOI. 1981. Big Desert Grazing Draft EIS. Idaho Falls, Idaho: Bureau of Land Management.

DOI. 1981. Big Desert Grazing Final EIS. Idaho Falls, Idaho: Bureau of Land Management.

DOI. 1979. Little Lost-Birch Creek Range Management Final Environmental Impact Statement. Idaho Falls, Idaho: Bureau of Land Management.

All were asked to supplement the list of documents with others that they recommend the planning team consult. Several attendees had brought copies of documents. The documents that were given to the planning team during the meeting included:

Idaho Department of Fish and Game. Antelope Management Plan.

Idaho Department of Fish and Game. Elk Management Plan.

Jefferson County. Comprehensive Plan. May 23, 1988.

Treaty with the Shoshones and Bannocks. July 3, 1868.

U.S. Department of Agriculture (USDA), Forest Service. Chapter VI: Public Comments of the Draft Environmental Impact Statement and Proposed Forest Plan for Challis National Forest.

USDA, Forest Service. Final Environmental Impact Statement for the Challis National Forest: Land and Resource Management Plan.

USDA, Forest Service. Final Environmental Impact Statement for the Challis National Forest: Land and Resource Management Plan Appendixes.

USDA, Forest Service. Land Resource Management Plan for the Challis National Forest.

USDA, Forest Service. Record of Decision for the USDA-Forest Services Final Environmental Impact Statement for the Challis National Forest Land and Resource Management Plan. June 3, 1987.

USDA, Forest Service. Summary for the Challis National Forest Final Environmental Impact Statement & Land and Resources Management Plan.

USDA, Forest Service. Challis National Forest Map.

USDA, Forest Service. Targhee National Forest Map.

U.S. Department of the Interior, National Park Service. Craters of the Moon National Monument General Management Plan. June 1992.

Working Agreement Between the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation and the Idaho Field Office of the U. S. Department of Energy Concerning Environment, Safety, Health, Cultural Resources, and Economic Self-Sufficiency.

In addition, Participation Forum attendees made the following comments on the list handed out:

- The 1991 Bonneville plan is not yet official. (Steven Serr suggested the planning team use the previous plan until the 1991 plan is adopted by the County Commissioners.)
- The Wilderness Society Economic Study (of counties around Yellowstone National Park). Marv Hoyt will get a copy for the planning team.
- City of Idaho Falls Comprehensive Plan (the planning team should call Rod Gilchrist at 529-1270 to request a copy).
- Medicine Lodge Resource Management Plan. (The planning team may already have this document and it may have been inadvertently left off the list.)
- Idaho Fish and Game Wildlife Management Plans and Master Plan. (Ted Chu brought the Elk Plan and Antelope Plan to the meeting.)
- The Memorandum of Understanding between the DOE and Idaho Fish and Game (Ted Chu will get a copy to the planning team).
- Bureau of Land Management, Shoshone District Environmental Impact Statement on the wilderness study areas and a second EIS that examined numerous small wilderness study areas.

- Butte County Soil and Water Conservation Plan.
- Clark County Interim Land Use Plan.
- Land use plan for Targhee National Forest and EIS.
- Memorandum of Understanding(s) between DOE and the Bureau of Land Management.
- Craters of the Moon Resource Management Plan.
- Memorandum of Understanding on air quality between DOE and Craters of the Moon (to be signed next week).
- Craters of the Moon Air Quality Management Plan. (Jon Jarvis and Vicki Snitzler-Neeck agreed to get copies of the final three documents to the planning team next week.)

ISSUES OF CONCERN. Next, the participation forum attendees were asked to list primary concerns that they hope the INEL Long-Term Land Use planning document will address. The following is the list of issues that were raised:

- Is it possible that the development of the long-term land use planning document will result in duplication of effort given the concurrent efforts on the INEL Environmental Restoration and Waste Management Environmental Impact Statement?
- Will NEPA compliance be required in developing the long-term land use planning document?
- What plans are being made for future public participation? If any, explain the relationship of the document to NEPA to the public.
- What time frame will be addressed by the planning document?
- Awareness of cultural resources on site.
- Safety of neighbors to INEL.
- Demand for county services by recreational activities is not balanced by economic benefits derived from tourist dollars.
- Expansion in service jobs does not result in increases in per capita income.
- State's ability to manage wildlife populations on site (example - hunting not presently allowed on site and animals use site as a refuge).
- Maintain air quality, water quality, groundwater, and wilderness values.
- Consult Idaho Department of Water Resources, State Historic Preservation Officer, the U.S. Fish & Wildlife Service (Threatened and Endangered Species), and the Army Corps of Engineers (Birch Creek).
- Maintenance of wildlife habitat.
- Grazing management, including administration of permitting agreements.

- Mineral extraction and development of material sites for counties and state.
- Agency access to other public lands across the site.
- Vegetation management, including fire management. A fire could come onto the site from adjoining land or vice versa. Fire management activities should involve cooperation between DOE and adjacent land owners.
- Appropriateness of boundaries should be examined.
- Boundaries are confusing in places.
- Site solid waste management.
- Third-party rights of way.
- Effective administration of joint services; many services overlap.
- Fire suppression/management coordination.
- Public perception of solid waste issues.
- Public needs to be better educated. Current public participation efforts are insufficient or inappropriate (issue for the entire land use program).
- A strategy for public participation should be developed for land use planning.

GOALS OF PLANNING DOCUMENT. The INEL Long-Term Land Use Participation Forum attendees were asked what goals they would like to see incorporated into the planning document. The following suggestions were made:

- Address all the issues discussed above.
- Protection of current and future public health, safety, and welfare.
- Enhance resource management and values.
- Protect against significant adverse environmental impacts.
- INEL long-term land uses should be integrated in the surrounding environment.
- **[What or who??]** Should define the relationships between the various agencies that are interested in or involved in site management.
- The document should be written in plain English.
- The plan should be enforceable and should incorporate a review process for noncomplying uses.
- The document should be a living document.
- The document should include monitoring and an amendment procedure.

- The DOE managers should commit to the plan.
- Internal integration: DOE should come to internal agreement on the plan.

ADDITIONAL ISSUES. The attendees were given a chance to raise any issues that they had not yet been given the opportunity to discuss. The following issues were raised:

- The plan should define desired future conditions on the site (goal).
- There should be continued interaction with this group.

NEXT STEPS. During discussion of the next steps that should be pursued, the Long-Term Land Use Participation Forum recommended that the DOE not consider meetings with their group as a substitute for public participation. One recommendation was that the DOE Planning Team publish an article in ***INEL Reporter***, including 1) information about the process being used to develop the long-term land use planning document, 2) a summary of the group memory from the first meeting, and 3) an address for submitting suggestions for assumptions, reference documents, areas of concern, and goals. John Robinson and Bob Brown agreed to pursue the idea within DOE and let the Participation Forum attendees know the outcome.

The following steps will be taken next to ensure continued efforts in producing a long-term land use planning document for the INEL:

- Wendy Green will provide the group memory to all Participation Forum attendees.
- All will read the group memory.
- DOE will generate a first draft of the long-term land use planning document.
- DOE will release Draft #1 to the participation forum attendees.
- All will review and discuss internally. (DOE requested that Participation Forum attendees not talk to the media prior to this time.)
- Participation Forum will meet to discuss Draft #1.
- DOE will produce Draft #2 based on feedback from the Participation Forum.
- Draft 2 will go out for public review, input, and revision.

MEETING EVALUATION. All in attendance were asked to communicate their impressions on the meeting and to discuss changes that they thought would improve the second meeting. The following were suggested:

Things That Went Well	Things to Change
• Open conversation	• Need more coffee
• White paper	• Need bigger room
• Broad participation	• Need more restrooms
• Facilitation	• Provide lunch
	• Provide juice

One request was that review materials be provided early enough before the next meeting that attendees have adequate time to read it.

ATTENDANCE. The following Participation Forum members attended the December 1st meeting:

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Participation Forum invitee Inez Orton, Planning and Zoning Administrator from Bingham County, did not attend.

Also in attendance were the following people:

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The meeting was adjourned at 12:00 noon after John Robinson and Bob Brown thanked everyone for attending.